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**Biomass Survey of Rockfish Stocks off
the Southwest Coast of Vancouver Island,
September 8-22, 1985 (M/V HOWE BAY)**

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BIOMASS SURVEY OF ROCKFISH STOCKS OFF THE SOUTHWEST
COAST OF VANCOUVER ISLAND, SEPTEMBER 8-22, 1985
(M/V HOWE BAY)

by

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ABSTRACT

Leaman, B. M., G. E. Gillespie, D. A. Nagtegaal, and R. D. Stanley. 1988. Biomass survey of rockfish stocks off the southwest coast of Vancouver Island, September 7-23, 1985 (M/V HOWE BAY). Can. Tech. Rep. Fish. Aquat. Sci. 1611: 99 p.

The M/V HOWE BAY was used to replicate a 1979 M/V ARCTIC HARVESTER trawl survey of rockfish (Sebastes spp.) stocks off the southwest coast of Vancouver Island and in U.S. waters off Cape Flattery (approximately 48°4'N to 49°25'N). Seventy-five hauls were completed. Catch rates for nearly all species were notably reduced from 1979 levels, with the catch rates of the four most prevalent species from the 1979 survey falling 80-90%. The 1985 total rockfish biomass estimate of 3,480 t is 49% of the 1979 estimate.

Catch rates for Pacific ocean perch (S. alutus) decreased 79% from 1979 levels. The size frequencies of S. alutus showed only a slight increase in modal lengths, and no evidence of substantial recruitment. Behavioral characteristics of rockfish and the characteristics of trawl surveys make absolute estimates of rockfish biomass unreliable, as catch rates may vary highly on the same site through different periods of the day. They are more useful as relative indicators of population trends, in conjunction with other methods.

The relative decrease in estimated biomass of S. alutus, when viewed with the lack of recruitment of young perch and the decreases in commercial (84%) and research (59%) catch rates during 1979-1985, indicates further deterioration of the stock, already in poor condition in 1979.

Key words: biomass survey, Pacific ocean perch, Vancouver Island

RÉSUMÉ

Leaman, B. M., G. E. Gillespie, D. A. Nagtegaal, and R. D. Stanley. 1988. Biomass survey of rockfish stocks off the southwest coast of Vancouver Island, September 7-23, 1985 (M/V HOWE BAY). Can. Tech. Rep. Fish. Aquat. Sci. 1611: 99 p.

On a utilisé le HOWE BAY pour répéter un relevé de stocks de scorpènes (*Sebastes* spp.) réalisé en 1979 au chalut par l'ARCTIC HARVESTER au large de la côte ouest de l'île de Vancouver et dans les eaux américaines au large du cap Flattery (environ 48°4'N à 49°25'N). On a effectué soixante-quinze traits de chalut. Les taux de capture pour presque toutes les espèces ont fortement diminué par rapport aux niveaux de 1979, les taux des quatre espèces les plus abondantes dans le relevé de 1979 baissant de 80 à 90 %. L'estimation de la biomasse totale de scorpènes en 1985 (3 840 t) équivaut à 49 % de l'estimation de 1979.

Les taux de capture du sébaste du Pacifique (*S. alutus*) ont diminué de 79 % par rapport aux niveaux de 1979. En ce qui concerne les fréquences des tailles de *S. alutus*, il y a eu une légère augmentation des longueurs modales sans aucune indication de recrutement important. Les caractéristiques du comportement des scorpènes et des relevés par chalutage rendent les estimations absolues de la biomasse des scorpènes peu sûres, étant donné que les taux de capture peuvent varier considérablement au même endroit à des périodes différentes de la journée. Elles sont plus utiles comme indicateurs relatifs des tendances démographiques, de concert avec d'autres méthodes.

La diminution relative de la biomasse estimée de *S. alutus*, alliée au faible recrutement de jeunes sébastes et aux baisses des taux de prises commerciales (84 %) et de recherches (59 %) entre 1979 et 1985, indique une détérioration plus prononcée du stock, qui était déjà en mauvais état en 1979.

Mots-clés: relevé de la biomasse, sébaste du Pacifique, île de Vancouver

INTRODUCTION

Pacific ocean perch (Sebastes alutus) is the only slope rockfish sufficiently abundant to support a directed fishery off the southwest coast of Vancouver Island. Evidence indicates that there are two stocks of S. alutus off Vancouver Island; one extending south from 49° 30' to at least the Juan de Fuca canyon, and a northern stock between approximately 49° 30' and 50° 30', which may be allied with the stock in Queen Charlotte Sound (Leaman 1985; Leaman and Kabata 1987). The northern stock has received little commercial or research attention, in part due to rough substrate, making fishing in most of the area difficult.

Estimates of the virgin biomass of the southern stock range between 53,000 metric tonnes (t) (Kimura and Tagart 1982) and 81,000 t implied by Westrheim et al. (1972). (For an evaluation of the methods and assumptions inherent in these estimates, see Leaman 1985.) Biomass surveys of this stock carried out by the U.S. National Marine Fisheries Service (Wilkins and Golden 1983) and the Fisheries Research Branch (Lapi and Richards 1981) in 1979 produced a total biomass estimate of 11,911 t. This represented a reduction of 77-85% in the stock, depending on the estimate of virgin biomass used. The Canadian portion of the stock also underwent deliberate, experimental overfishing from 1982 to 1985, in an attempt to inject a strong negative anomaly in the age frequency composition of the stock. Such an anomaly, if generated, could validate the estimate of stock biomass and the ageing method used for this species, as it progressed through the age spectrum of the stock.

Rockfish populations are characterized by low rates of growth, fecundity and natural mortality, as well as fishable stocks composed of multiple age groups. These attributes suggest low productivity and a high sensitivity to exploitation.

The purpose of this cruise was to replicate samples from the Canadian survey in 1979, and the U.S. survey in 1985, providing comparable biological data to assess the effects of overfishing, and assist in the evaluation of exploitation effects.

MATERIALS AND METHODS

VESSEL AND TRAWL SPECIFICATIONS

Complete specifications for the M/V HOWE BAY, a 28 m (92 ft) commercial stern trawler, are listed in Appendix Table 1. An Atlantic Western IIA bottom trawl with a 23 m (45 ft) headrope and 32.6 m (107 ft) footrope was used for all hauls (see Appendix Figure 1; Appendix Table 2). The codend was composed of 7 cm (3 inch) mesh, with 11 cm (4.5 inch) mesh in the body and wings.

SURVEY AREA

The survey area closely matched that described by Lapi and Richards (1981), running north from the Canada-U.S. boundary area (approximately 48° 4' N) to Estevan Point, between depths of 165 and 457 m (90-250 fath).

Direction, duration and location of hauls replicated those made by the M/V ARCTIC HARVESTER during a similar biomass survey in September, 1979 (Lapi and Richards 1981) and those in the U.S. zone by the M/V MARATHON between April 1 and May 30, 1985 (Ito et al. 1987).

SAMPLING METHODS

Methods for determining catch weights and species composition follow those of Nagtegaal et al. (1986). Catches <0.5 t were sorted completely and weighed by species. Catches >0.5 t were measured using an MSI Sea Weigh Model 2200 Load Cell. The full codend was weighed, the catch spilled onto a cargo net on the deck, and the empty codend re-weighed to obtain the weight of the catch by difference. The catch was then rolled onto a conveyor system using the cargo net, and samples taken from the start, middle, and end as the catch was processed.

Biological data in the form of fork length (to the nearest cm), sex, maturity, and sagittal otoliths were taken for S. alutus and S. brevispinis from most hauls. Otoliths were stored in a glycerin/water/thymol solution and returned to the Pacific Biological Station for age determination. Length frequency samples were converted to weight-at-length using the relationship of Westrheim and Thomson (1971); the total weight of the catch for the appropriate locality was then partitioned into proportions of weight at each length interval, on the basis of locality length samples. Maturity condition was assessed according to criteria presented in Appendix Table 8.

Biomass was estimated using the method described by Leaman and Nagtegaal (1982). Lapi and Richards (1981) did not publish biomass estimates derived from their survey results, although such estimates were calculated. Confidence intervals were not calculated, and their point estimates are presented for comparative purposes only.

RESULTS

AREA DELINEATION AND CATCH

Hauls 1-46 and 58-68 replicated hauls made by the M/V ARCTIC HARVESTER in September, 1979. Hauls 48-56 replicated hauls by the M/V

MARATHON in the U.S. zone during May, 1985, and hauls 47 and 69-75 were additional replicates in the Cape Flattery South locality. Haul 57 was not used in any analyses, as the main warps were uneven by 50 m, and no catch was recorded (Table 1; Fig. 1; Appendix Table 3).

Catches and catch rates for major species (Tables 2 and 3) were notably reduced from the 1979 levels (Tables 4 and 5), with the exceptions of S. zacentrus, which was relatively unchanged, and Merluccius productus, which was nearly double the 1979 catch rate. The highest catch rates for M. productus in 1985 were from the Clayoquot North and Deep Big Bank North localities.

ROCKFISH CATCHES AND CATCH RATES

Catches and catch rates for rockfishes (Tables 6-8) declined from 1979 levels (Tables 9 and 10) with the exceptions of S. brevispinis and S. zacentrus, which were caught at about the same rate in both years, and S. flavidus, which was not encountered in the 1979 survey. The catch rates of the four most prevalent rockfish in the 1979 survey were reduced by 80-90%, with S. alutus dropping over 900 kg/h from the 1979 rate (1146 kg/h).

Only four species of rockfish were recorded in all five of the depth strata sampled: S. alutus, S. babcocki, S. crameri, and S. diploproa (Table 11). All of these species exhibited their highest catch rates at moderate depths (between 221 and 384 m). S. aleutianus and S. borealis had highest catch rates in the deepest stratum, while S. entomelas was encountered only between 221 and 384 m. All other rockfish showed an inverse relation of catch rate and depth.

Catch rates of the M/V HOWE BAY for hauls in U.S. waters were generally higher than those of the U.S. survey vessel (Table 12). It should be noted that the Canadian survey vessel used a larger net, and that S. alutus availability is generally higher in September than in May, when the U.S. survey was conducted. This seasonal availability phenomenon may also account for the differences in species composition between some of the paired tows of the two surveys.

BIOMASS ESTIMATES

The 1985 total rockfish biomass estimate (Tables 13 and 14) was 3480 t, a decrease of 51% from the 1979 estimate of 7081 t (Tables 15-17). The largest biomass estimates in 1985 were those of S. alutus (1862 t), S. zacentrus (387 t), S. diploproa (258 t), S. paucispinis (119 t), and S. brevispinis (197 t). The largest estimates from 1979 were S. alutus (4217 t), S. diploproa (1207 t), S. paucispinis (351 t), S. aleutianus (312 t), and S. proriger (173 t). Decreases from 1979 biomass estimates were noted in all

localities (ranging from a decrease of 92% in Clayoquot North to 20% in Estevan South), with the exception of Deep Big Bank North, which increased to 279% of the 1979 estimate. This increase is most apparent in estimated biomass of S. alutus (56 t to 327 t), and of S. zacentrus (24 t to 112 t).

BIOLOGICAL SAMPLES

A total of 1,982 S. alutus and 100 S. brevispinis were sampled during the HOWE BAY survey. The modal fork lengths for S. alutus in the HOWE BAY survey were: 39 cm (male), 43 cm (female), and 40 cm (sexes combined) (Table 18; Fig. 2; Appendix Table 6). The modal fork lengths for the ARCTIC HARVESTER were: 38 cm (male), 40 cm (female), and 38 cm (sexes combined) (Table 19; Fig. 3). For S. alutus males, 61% were maturing, 29% were resting, and the remainder in the immature stage. For S. alutus females, 82% were maturing, 6% resting, and the rest immature. For S. brevispinis males, 58% were maturing, 41% were resting, and the remainder immature. Female S. brevispinis were all either spent (17%) or resting (83%) (Appendix Tables 6 and 7).

DISCUSSION

Absolute estimates of rockfish biomass are extremely difficult, if not impossible, to obtain from trawl surveys (Leaman and Nagtegaal 1986). The reasons for this are chiefly related to interactions between the diel behaviour of the species and the time available for resource surveys. Within-site variation in catch rates, hence biomass estimates, can often be 2 orders of magnitude or greater over the course of a normal diel period. This variance may be even higher during periods of large tidal range (Leaman and Nagtegaal 1986). Estimates of among-site variance in catch rates from trawl surveys will underestimate true variance due to the lack of, or insufficient, replication at each survey station (Leaman and Nagtegaal 1986; Nagtegaal et al. 1986). It is therefore not surprising that absolute rockfish biomass estimates from surveys are seldom validated by other techniques, such as analytical or biological models.

Trawl surveys may produce useful relative estimates of rockfish biomass under some conditions and are certainly more useful than raw catch rates from commercial fisheries (Archibald et al. 1983; Leaman and Nagtegaal 1986). The latter tend to be biased at both high and low biomass levels because they measure only catching effort, rather than a combination of searching and catching effort. This is particularly important for species such as rockfish which aggregate, often at physical features that continue to attract fish when previous residents have been removed by the fishery.

The sampling scheme for the 1979 ARCTIC HARVESTER survey did not follow any rigorous allocation framework. Broad depth and bottom topography strata were devised, and hauls were made within each subarea at the skipper's discretion (Lapi and Richards 1981). The number and arrangement of hauls in the Clayoquot north and Deep Big Bank north localities were limited by availability of trawlable bottom. The objective was to have the skipper, under the above guidelines, achieve as comprehensive a coverage as possible.

The size of the area to be surveyed during this cruise, compounded by aggregation of the target species both by latitude and depth interval required that a subsampling scheme be incorporated to reduce the heterogeneity of catch rates between tows. Sampling intensity should ideally be allocated according to some characteristic of the sampled species (Leaman 1981). The 1979 allocation of sampling effort was not proportional to the area of the depth strata, nor to the estimates or variability about the estimates of rockfish abundance, or S. alutus abundance (Table 20). However, the duration of the hauls, combined with the end-to-end arrangement of hauls, did provide good linear coverage over depth intervals and localities.

The decline in relative S. alutus biomass estimates between the 1979 and 1985 surveys (56%) should be viewed with concern, particularly because it is mirrored by both commercial catch rates (Fig. 4) and similar surveys by U.S. agencies in the southern portion of this stock's range, during the same period. The 1985 U.S. survey showed a relative decline of over 63% in S. alutus biomass since the 1979 survey (Ito et al. 1987). Major declines in estimated biomass occurred in those areas that have received major fishing pressure during 1979-1985. These relative declines were predicted (Leaman 1985), as a result of both experimental overfishing by Canada and harvesting at an erroneously high equilibrium rate in the U.S.

The size frequencies of S. alutus over the 1979-1985 period (Figs. 2-3) are not encouraging. There is no evidence of substantial recruitment to the stock since at least 1979, and the shifts in modal size since 1979 reflect only normal growth of those cohorts already present in the 1979 samples. Exactly the same observations were made on the U.S. survey of the southern portion of this stock (Ito et al. 1987).

In summary, the S. alutus stock off southwest Vancouver Is. continues to be in poor condition and appears to have deteriorated since 1979. Characteristics of fish size and catch rate throughout the range of the 1979 and 1985 surveys show poor recruitment and biologically unhealthy features, from the perspectives of both stock and fishery maintenance. In the absence of substantial recruitment, the stock is projected to remain in poor condition for a minimum of 5-10 years.

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Table 1. Haul numbers and total effort by locality, M/V HOWE BAY, September, 1985. Haul #57 was not included in any analyses because of a technical difficulty resulting in no catch.

Area name	Haul numbers	Effort (h)
Estevan North	1-15	27.6
Estevan South	16-23	14.2
Clayoqout North	24,25	3.3
Clayoqout South	26-36	20.0
Deep Big Bank North	37,38	3.1
Deep Big Bank South	39-46,67,68	20.5
Cape Flattery North	66	0.2
Cape Flattery South	58-65	11.2
ARCTIC HARVESTER (1979) Replicates (total)	1-46,58-68	100.1
MARATHON Replicates (U.S. Zone)	48-56	4.4
Cape Flattery South (1985) Replicates	47,69-75	13.4
Total		117.9

Table 2. Species composition of total catch (kg) by locality, M/V HOWE BAY, September, 1985. Other hauls includes all hauls which did not replicate those by either the ARCTIC HARVESTER (September 1979) or the MARATHON (Apr11-May 1985). Other species includes all species which accounted for less than or equal to 1% of the total catch.

	Locality										% of Total	
	Estevan		Clayoquot		Deep Big Bank		Cape Flattery		U.S. Zone			
	North	South	North	South	North	South	North	South	Other hauls	Total		
<i>Sebastes alutus</i>	3,799	781	190	6,910	1,390	3,614	0	7,462	2,221	12,141	38,508	41.08
<i>Merluccius productus</i>	4,978	2,374	1,701	1,407	440	6,263	0	3,200	635	2,231	23,229	24.78
<i>Anoplopoma fimbria</i>	519	214	34	1,199	327	478	0	998	61	1,541	5,371	5.73
<i>Sebastes diploproa</i>	902	234	95	647	373	455	0	868	99	1,089	4,762	5.08
<i>Sebastes zacentrus</i>	196	99	17	518	477	78	0	776	462	1,369	3,992	4.26
<i>Atheresthes stomias</i>	161	89	33	202	150	829	0	453	170	805	2,892	3.09
<i>Sebastes paucispinis</i>	94	19	4	101	10	41	0	1,085	495	122	1,971	2.10
Other species	2,287	902	46	1,932	513	1,741	0	3,440	715	1,438	13,014	13.88
Total catch (kg)	12,936	4,712	2,120	12,916	3,680	13,499	0	18,282	4,858	20,736	93,739	100.00
Total effort (h)	27.6	14.2	3.3	20.0	3.1	20.5	0.2	11.2	4.4	13.4	117.9	

Table 3. Catch rates (kg/hr) for major species of the catch of the M/V HOME BAY by locality, September, 1985. Other hauls includes all hauls which did not replicate those by either the ARCTIC HARVESTER (September 1979) or the MARATHON (April-May 1985). Other species includes all species which accounted for less than or equal to 1% of the total catch.

	Locality										Total
	Estevan		Clayquot		Deep Big Bank		Cape Flattery		U.S. Zone		
	North	South	North	South	North	South	North	South			
<u>Sebastes alutus</u>	137.64	55.00	57.58	345.50	448.39	176.29	0.00	666.25	504.77	906.04	326.62
<u>Merluccius productus</u>	180.36	167.18	515.45	70.35	141.94	305.51	0.00	285.71	144.32	166.49	197.02
<u>Anoplopoma fimbria</u>	18.80	15.07	10.30	59.95	105.48	23.32	0.00	89.11	13.86	115.00	45.56
<u>Sebastes diploproa</u>	32.68	16.48	28.79	32.35	120.32	22.20	0.00	77.50	22.50	81.27	40.39
<u>Sebastes zacentrus</u>	7.10	6.97	5.15	25.90	153.87	3.80	0.00	69.29	105.00	102.16	33.86
<u>Atheresthes stomias</u>	5.83	6.27	10.00	10.10	48.39	40.44	0.00	40.45	38.64	60.07	24.53
<u>Sebastes paucispinis</u>	3.41	1.34	1.21	5.05	3.23	2.00	0.00	96.88	112.50	9.10	16.72
<u>Other species</u>	82.86	63.52	13.94	96.60	165.48	84.93	0.00	307.14	162.50	107.31	110.38
Total effort (h)	27.6	14.2	3.3	20.0	3.1	20.5	0.2	11.2	4.4	13.4	117.9

Table 4. Summary of total catch (kg), M/V ARCTIC HARVESTER, September, 1979. Other species includes all species which amounted to less than or equal to 1% of the total catch.

Species	Catch (kg)	% of total catch
<u>Sebastes alutus</u>	108,070	39.38
<u>Anoplopoma fimbria</u>	37,066	13.51
<u>S. diploproa</u>	32,287	11.76
<u>Atheresthes stomias</u>	23,756	8.66
<u>S. paucispinis</u>	13,288	4.84
<u>Microstomus pacificus</u>	12,619	4.60
<u>Merluccius productus</u>	10,150	3.70
<u>S. aleutianus</u>	8,803	3.21
<u>Sebastolobus alascanus</u>	4,933	1.80
<u>S. proriger</u>	3,232	1.18
<u>S. crameri</u>	2,921	1.06
<u>S. babcocki</u>	2,760	1.01
Other species	14,556	5.30
Total	274,441	100.00

Table 5. Catch rates (kg/hr) for major species encountered by the M/V ARCTIC HARVESTER in 1979, and by the M/V HOWE BAY in 1985. Catch rates for the HOWE BAY include only hauls 1-46 and 58-68, i.e. only those hauls which replicated hauls by the ARCTIC HARVESTER in September 1979.

Species	ARCTIC HARVESTER	HOWE BAY
<u>Sebastes alutus</u>	1146.02	241.22
<u>Merluccius productus</u>	107.64	203.43
<u>Anoplopoma fimbria</u>	393.06	37.65
<u>S. diploproa</u>	342.39	35.70
<u>S. zacentrus</u>	27.59	21.59
<u>Atheresthes stomias</u>	251.92	19.15
<u>S. paucispinis</u>	140.91	13.53

Table 6. Rockfish catch (kg) by species and locality, M/V HOME BAY, September, 1985. "Other hauls" includes hauls which did not replicate those by either the ARCTIC HARVESTER (September 1979) or the MARATHON (April-May 1985).

	Locality										Other hauls	Total
	Estevan		Clayoquot		Deep Big Bank		Cape Flattery		U.S. Zone			
	North	South	North	South	North	South	North	South	North	South		
<u>S. aleutianus</u>	454	124	0	298	0	0	0	0	4	0	880	
<u>S. alutus</u>	3,799	781	190	6,910	1,390	3,614	0	4,462	2,221	12,141	38,508	
<u>S. babcocki</u>	468	117	2	76	54	262	0	165	5	159	1,308	
<u>S. borealis</u>	495	0	0	37	0	54	0	0	23	0	609	
<u>S. brevispinis</u>	64	121	4	139	0	204	0	572	201	0	1,305	
<u>S. crameri</u>	181	85	24	144	0	253	0	64	245	275	1,271	
<u>S. diploproa</u>	902	234	95	647	373	455	0	868	99	1,089	4,762	
<u>S. elongatus</u>	51	12	0	6	0	27	0	112	7	38	253	
<u>S. entomelas</u>	20	7	0	0	0	7	0	6	20	21	81	
<u>S. flavidus</u>	0	0	0	188	0	0	0	0	26	0	214	
<u>S. helvomaculatus</u>	7	0	0	4	0	12	0	24	0	0	47	
<u>S. paucispinis</u>	94	19	4	101	10	41	0	1,085	495	122	1,971	
<u>S. pinniger</u>	0	22	0	61	0	1	0	36	37	0	157	
<u>S. proriger</u>	15	95	5	431	0	116	0	181	31	6	880	
<u>S. reedl</u>	0	50	0	247	30	0	0	341	0	412	1,080	
<u>S. zacentrus</u>	196	99	17	518	477	78	0	776	462	1,369	3,992	
Total Catch (kg)	6,746	1,766	341	9,807	2,334	5,124	0	11,692	3,876	15,632	57,318	
Total Effort (h)	27.6	14.2	3.3	20.0	3.1	20.5	0.2	11.2	4.4	13.4	117.9	

Table 7. Mean rockfish catch rates (kg/hr) by species and locality, M/V HOWE BAY, September, 1985. Means are calculated as averages of catch rates between tows within an area, and presented with a 95% confidence interval. "Other hauls" includes hauls which did not replicate those by either the ARCTIC HARVESTER (September 1979) or the MARATHON (April-May 1985).

	Locality										Other hauls
	Estevan		Clayoquot		Deep Big Bank		Cape Flattery		U.S. Zone		
	North	South	North	South	North	South	North	South			
<u>S. aleutianus</u>	16.91±25	9.24±13	0.00	20.12± 45	0.00	0.00	0.00	0.00	0.94± 2	0.00	
<u>S. alutus</u>	142.78±99	57.52±39	56.02±102	341.66±208	360.48±3227	177.60±98	0.00	602.70±619	495.03±504	905.56±574	
<u>S. babcocki</u>	17.04±10	9.50± 5	0.85± 11	4.15± 4	20.30±149	12.29±12	0.00	14.35± 13	1.16± 3	11.45± 12	
<u>S. borealis</u>	15.77±20	0.00	0.00	2.54± 6	0.00	2.14± 5	0.00	0.00	5.16± 9	0.00	
<u>S. brevispinis</u>	2.04± 2	14.39±23	1.65± 21	6.89± 6	0.00	7.77±15	0.00	38.70± 91	56.82±119	0.00	
<u>S. crameri</u>	7.75± 6	5.79± 5	6.41± 51	8.01± 11	0.00	11.27±13	0.00	5.09± 7	54.49± 96	15.61± 19	
<u>S. diploproa</u>	35.73±22	15.52±17	33.27±229	34.42± 22	151.27±1190	22.14±17	0.00	73.33± 61	22.05± 51	70.39± 47	
<u>S. elongatus</u>	1.73± 3	2.30± 5	0.00	0.51± 1	0.00	1.54± 3	0.00	9.23± 7	1.61± 3	3.83± 5	
<u>S. entomelas</u>	0.61± 1	0.5 ± 1	0.00	0.00	0.00	0.45± 1	0.00	0.62± 1	4.49± 6	1.63± 4	
<u>S. flavidus</u>	0.00	0.00	0.00	7.69± 10	0.00	0.00	0.00	0.00	7.59± 17	0.00	
<u>S. heluomaculatus</u>	0.27± 1	0.00	0.00	0.25± 1	0.00	0.66± 1	0.00	2.11± 4	0.00	0.00	
<u>S. paucispinis</u>	3.45± 3	2.74± 5	1.65± 21	4.21± 4	2.45± 31	2.29± 5	0.00	74.62±160	142.04±315	8.41± 10	
<u>S. plinniger</u>	0.00	1.44± 2	0.00	2.42± 4	0.00	0.20± 1	0.00	2.68± 4	10.03± 17	0.00	
<u>S. proriger</u>	0.48± 1	6.00±13	2.05± 26	16.23± 27	0.00	5.10± 7	0.00	12.97± 21	8.70± 17	0.52± 1	
<u>S. reedi</u>	0.00	10.92±25	0.00	15.36± 27	7.25± 92	0.00	0.00	28.39± 26	0.00	55.51±117	
<u>S. zacentrus</u>	6.08± 9	22.06±52	6.85± 87	28.11± 23	123.55± 115	3.77± 4	0.00	65.71± 37	112.32± 99	94.74± 70	
Total effort (hr)	27.6	14.2	3.3	20.0	3.1	20.5	0.2	11.2	4.4	13.4	

Table 8. Rockfish mean catch rates (kg/hr) by locality and depth stratum, M/V HOME BAY, September, 1985. Means are calculated as averages of catch rates between tows within an area and depth stratum, and presented with a 95% confidence interval. Estimates lacking a confidence interval are point estimates only. Data includes only hauls 1-46 and 58-68, i.e. only those which replicate hauls by the ARCTIC HARVESTER in September, 1979.

Locality	Estevan North					Estevan South				
	160-220	221-275	276-330	331-384	385-439	160-220	221-275	276-330	331-384	
<u>S. aleutianus</u>	0.00	0.00	0.00	24.07±94	90.45±1058	0.00	16.36	0.00	28.61±208	
<u>S. alutus</u>	53.59±77	62.15±221	295.90±473	103.92±319	28.40±26	1.40±18	52.78	80.12±153	82.11±335	
<u>S. babcocki</u>	3.55±45	24.51±102	22.02±27	17.01±61	6.93±73	9.27±41	21.82	6.78±18	7.63±42	
<u>S. borealis</u>	0.00	0.00	1.63±7	57.79±189	27.35±347	0.00	0.00	0.00	0.00	
<u>S. brevispinis</u>	7.55±26	4.99±19	0.00	0.00	0.00	17.59±210	74.56	1.76±9	0.00	
<u>S. crameri</u>	1.30±16	0.00	16.43±24	5.03±10	8.15±103	1.13±14	0.00	9.12±21	8.32±28	
<u>S. diploproa</u>	.47±6	36.54±97	65.32±102	26.52±10	9.61±85	1.67±21	0.00	35.72±58	6.79±8	
<u>S. elongatus</u>	12.65±139	0.00	0.00	0.00	0.00	.86±11	16.36	0.00	0.00	
<u>S. entomelas</u>	0.00	0.00	0.00	2.87±15	0.00	0.00	0.00	1.25±6	0.00	
<u>S. flavidus</u>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<u>S. helvoscusculus</u>	1.72±11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<u>S. paucispinis</u>	.90±11	6.83±27	4.92±9	2.03±11	0.00	0.00	16.36	1.76±9	0.00	
<u>S. pinniger</u>	0.00	0.00	0.00	0.00	0.00	3.05±39	0.00	1.76±9	0.00	
<u>S. proriger</u>	3.30±29	0.00	0.00	0.00	0.00	22.07±293	0.00	1.25±6	0.00	
<u>S. reedi</u>	0.00	0.00	0.00	0.00	0.00	.80±10	85.45	0.00	0.00	
<u>S. zacentrus</u>	29.84±379	9.07±11	.80±3	0.00	0.00	.80±10	174.55	0.00	0.00	
Total	114.36±187	143.79±288	408.78±268	238.83±382	170.58±336	58.14±309	458.24	139.06±181	133.32±85	
# of hauls	2	3	5	3	2	2	1	3	2	

Table 8 (cont'd)

Locality	Clayoquot North		Clayoquot South				Deep Big Bank North	
	221-275	276-330	160-220	221-275	276-330	331-384	160-220	221-275
<u>S. alutianus</u>	0.00	0.00	0.00	0.00	0.00	220.74	0.00	0.00
<u>S. alutus</u>	48.00	63.93	183.99±52	454.57±868	244.45±496	444.44	614.45	106.50
<u>S. babcocki</u>	1.60	0.00	4.19±15	2.04±5	8.43±107	5.93	9.65	32.95
<u>S. borealis</u>	0.00	0.00	0.00	0.00	0.00	27.41	0.00	0.00
<u>S. brevispinis</u>	3.20	0.00	14.24±38	6.58±13	0.00	0.00	0.00	0.00
<u>S. crameri</u>	2.40	10.33	1.85±10	1.37±5	30.42±304	14.81	0.00	0.00
<u>S. diploproa</u>	51.20	15.25	16.85±48	27.96±37	92.61±146	2.96	57.65	244.89
<u>S. elongatus</u>	0.00	0.00	.94±5	.53±2	0.00	0.00	0.00	0.00
<u>S. entomelas</u>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. flavidus</u>	0.00	0.00	15.95±84	7.32±19	0.00	0.00	0.00	0.00
<u>S. helvomiculatus</u>	0.00	0.00	0.00	0.00	1.13±14	0.00	0.00	0.00
<u>S. paucispinis</u>	3.20	0.00	5.31±28	3.56±12	6.27±79	0.00	4.85	0.00
<u>S. plinniger</u>	0.00	0.00	5.82±31	1.81±8	0.00	0.00	0.00	0.00
<u>S. proriger</u>	4.00	0.00	49.32±234	6.08±16	0.00	0.00	0.00	0.00
<u>S. reedi</u>	0.00	0.00	44.49±234	5.43±17	4.10±52	0.00	14.45	0.00
<u>S. zacentrus</u>	13.60	0.00	32.15±115	42.53±172	0.00	0.00	211.25	35.86
Total	127.20	89.51	374.49±225	559.19±560	387.07±491	716.30	912.30	420.20
# of hauls	1	1	3	5	2	1	1	1

Table 8 (cont'd)

Locality	Deep Big Bank South				Cape Flattery South			
	160-220	221-275	276-330	331-384	160-220	221-275	276-330	
<u>S. aleutianus</u>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. alutus</u>	17.63±29	215.17±635	262.22±481	253.06±304	56.48±424	685.23±1625	1282.48	
<u>S. babcocki</u>	1.28±7	2.5±32	20.27±43	26.62±269	13.18±167	11.84±33	29.27	
<u>S. borealis</u>	0.00	0.00	7.02±37	0.00	0.00	0.00	0.00	0.00
<u>S. brevispinis</u>	23.84±111	0.00	1.99±10	0.00	154.64±1965	0.00	0.00	0.00
<u>S. crameri</u>	0.00	0.00	22.93±81	21.83±76	0.00	3.74±11	21.96	
<u>S. diploproa</u>	.42±2	8.10±23	44.65±31	35.00±312	1.61±20	85.69±138	155.01	
<u>S. elongatus</u>	4.25±21	1.19±15	0.00	0.00	17.07±66	7.92±14	0.00	0.00
<u>S. entomelas</u>	0.00	2.05±26	0.00	0.00	0.00	0.96±4	0.00	0.00
<u>S. flavidus</u>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. helvomiculatus</u>	.21±1	0.00	1.91±10	0.00	7.24±92	0.48±2	0.00	0.00
<u>S. paucispinis</u>	0.00	11.23±142	0.00	0.00	287.98±3286	3.61±16	0.00	0.00
<u>S. plinniger</u>	.21±1	0.00	0.00	0.00	10.58±18	0.00	0.00	0.00
<u>S. proriger</u>	9.30±45	10.14±129	.90±5	0.00	51.71±141	0.00	0.00	0.00
<u>S. reedii</u>	0.00	0.00	0.00	0.00	25.29±250	35.30±70	0.00	0.00
<u>S. zacentrus</u>	1.61±6	5.01±34	7.58±26	0.00	90.95±782	54.03±62	73.62	
Total	58.75±76	255.39±226	369.47±297	336.51±176	716.73±1336	888.80±957	1562.34	
# of hauls	3	2	3	2	2	5	1	

Table 9. Rockfish mean catch rates (kg/hr) by locality and depth stratum, M/V ARCTIC HARVESTER, September, 1979. Means are calculated as averages between tows within an area and depth stratum.

Locality	Estevan North			Estevan South			Clayoquot North		Clayoquot South		Deep Big Bank North	
	183-237	238-290	291-365	183-237	238-290	291-365	183-365	183-365	183-237	238-365	183-365	183-365
<u>S. aleuticus</u>	0.00	0.00	75.80	0.00	35.23	4.84	92.18	1025.35	41.39	91.28		
<u>S. alutus</u>	274.31	3878.69	721.99	46.28	137.01	279.83	1310.08	1353.73	1481.81	283.19		
<u>S. babcocki</u>	11.76	42.50	41.26	165.98	12.17	13.34	86.61	6.16	65.73	29.66		
<u>S. borealis</u>	0.00	0.00	358.51	0.00	0.00	7.93	0.00	0.00	3.40	93.85		
<u>S. brevispinis</u>	1.91	0.00	0.00	33.06	0.00	0.00	32.35	14.38	0.00	0.00		
<u>S. crameri</u>	0.00	23.21	70.66	18.07	3.72	4.36	0.00	0.00	39.09	0.00		
<u>S. elongatus</u>	31.86	0.00	0.00	24.24	0.00	3.23	4.85	23.83	0.00	0.00		
<u>S. helvomaculatus</u>	15.70	0.00	0.00	8.81	0.00	0.00	18.94	6.87	0.00	7.70		
<u>S. paucispinis</u>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.87	0.00	0.00		
<u>S. piniger</u>	.73	0.00	0.00	25.49	0.00	0.00	9.70	0.00	0.00	0.00		
<u>S. proriger</u>	64.58	0.00	0.00	229.19	0.00	0.00	19.41	0.00	0.00	0.00		
<u>S. roeddi</u>	0.00	0.00	0.00	0.00	0.00	0.00	1277.20	0.00	0.00	0.00		
<u>S. zacentrus</u>	37.54	18.97	0.00	19.83	0.00	0.00	154.53	70.20	0.00	120.62		
Total	438.39	3963.37	1268.22	570.95	188.13	313.53	3005.85	2507.39	1631.42	626.3		
# of hauls	2	5	5	2	2	3	2	4	3	2		

Table 9 (cont'd)

Locality	Deep Big Bank South			Cape Flattery North		Cape Flattery South		
	183-237	238-290	291-365	183-365	183-237	238-290	291-365	
<u>S. aleutianus</u>	0.00	0.00	13.19	0.00	0.00	15.73	0.00	
<u>S. alutus</u>	683.66	1071.80	1104.49	492.58	664.22	2736.38	8395.21	
<u>S. babcocki</u>	2.46	21.84	75.88	20.24	24.26	5.51	0.00	
<u>S. borealis</u>	0.00	4.87	58.02	0.00	90.10	59.60	0.00	
<u>S. brevispinis</u>	10.03	0.00	0.00	0.00	0.00	0.00	0.00	
<u>S. crameri</u>	0.00	9.92	485.25	0.00	0.00	0.00	64.41	
<u>S. elongatus</u>	28.83	0.00	0.00	0.00	6.93	0.00	0.00	
<u>S. helvomiculatus</u>	10.16	0.00	0.00	0.00	0.00	0.00	0.00	
<u>S. paucispinis</u>	0.00	0.00	0.00	0.00	3406.86	27.55	0.00	
<u>S. pinniger</u>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<u>S. proriger</u>	20.33	0.00	0.00	0.00	463.97	0.00	0.00	
<u>S. reedi</u>	0.00	0.00	0.00	0.00	100.49	0.00	85.88	
<u>S. zacentrus</u>	0.00	19.64	0.00	0.00	48.51	21.06	107.36	
Total	755.47	1128.07	1736.83	512.82	4805.34	2865.83	8652.86	
# of hauls	3	3	2	1	2	3	1	

Table 10. Catch (kg) and total catch rates (kg/hr) for rockfishes by the M/V ARCTIC HARVESTER, September, 1979, and by the M/V HOWE BAY, September, 1985. Total catch rate is calculated as total catch divided by total effort over all areas and depths. Data for the HOWE BAY include only hauls 1-46 and 58-68, i.e., only those hauls which replicate hauls by the ARCTIC HARVESTER in September 1979.

Cruise	ARCTIC HARVESTER		HOWE BAY	
Depth range (m)	183-365		160-439	
Effort (hr)	94.3		100.1	
	Catch	Catch rate	Catch	Catch rate
<i>S. aleutianus</i>	8,803	93.35	876	8.75
<i>S. alutus</i>	108,070	1146.02	24,146	241.22
<i>S. babcocki</i>	2,760	29.27	1,144	11.43
<i>S. borealis</i>	1,902	20.17	586	5.85
<i>S. brevispinis</i>	1,121	11.89	1,104	11.03
<i>S. crameri</i>	2,921	30.98	751	7.50
<i>S. diploproa</i>	32,287	342.39	3,574	35.70
<i>S. elongatus</i>	692	7.34	208	2.08
<i>S. entomelas</i>	120	1.27	40	0.40
<i>S. flavidus</i>	0	0.00	188	1.88
<i>S. helvomaculatus</i>	206	2.18	47	0.47
<i>S. paucispinis</i>	13,228	140.28	1,354	13.53
<i>S. pinniger</i>	191	2.03	120	1.20
<i>S. proriger</i>	3,232	34.27	843	8.42
<i>S. reedi</i>	2,077	22.03	668	6.67
<i>S. zacentrus</i>	2,602	27.59	2,161	21.59
Total	180,212	1191.05	37,810	377.72

Table 11. Catch rates (kg/h) of rockfish by depth interval from catches by the M/V HOWE BAY, September, 1985. Catch rates are calculated as total catch divided by total effort, over all localities.

	Depth interval (m)				
	160-220	221-275	276-330	331-384	385-439
<u>S. aleutianus</u>	0.00	0.33	0.00	36.52	90.45
<u>S. alutus</u>	110.78	354.93	286.01	168.41	28.40
<u>S. babcocki</u>	5.72	10.18	15.64	16.22	6.93
<u>S. borealis</u>	0.00	0.00	2.07	25.40	27.35
<u>S. brevispinis</u>	33.46	4.96	0.82	0.00	0.00
<u>S. crameri</u>	0.79	1.40	17.96	11.17	8.15
<u>S. diploproa</u>	8.97	48.19	60.10	21.72	9.61
<u>S. elongatus</u>	5.78	2.38	0.00	0.00	0.00
<u>S. entomelas</u>	0.00	0.48	0.27	1.14	0.00
<u>S. flavidus</u>	3.52	2.58	0.00	0.00	0.00
<u>S. helvomaculatus</u>	2.62	0.10	0.57	0.00	0.00
<u>S. paucispinis</u>	39.78	5.34	2.61	0.80	0.00
<u>S. pinniger</u>	3.19	0.64	0.38	0.00	0.00
<u>S. proriger</u>	23.89	3.67	0.47	0.00	0.00
<u>S. reedi</u>	14.54	11.22	0.49	0.00	0.00
<u>S. zacentrus</u>	41.50	34.54	6.92	0.00	0.00
Total	294.54	480.94	394.31	281.38	170.89
Effort (hr)	26.1	27.1	28.4	15.0	3.4

Table 12. Comparison of catch rates (kg/hr) between Canadian (M/V HOWE BAY, September, 1985) and U.S. (M/V MARATHON, April-May, 1985) surveys for Cape Flattery Spit. The U.S. survey was carried out using a Nor'eastern net.

Haul #	Can. 48	U.S. 34	Can. 49	U.S. 38	Can. 50	U.S. 33
<u>S. aleutianus</u>	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. alutus</u>	54.78	0.00	6.00	0.00	486.00	388.38
<u>S. aurora</u>	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. babcocki</u>	0.00	0.00	0.00	8.16	0.00	45.18
<u>S. borealis</u>	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. brevispinis</u>	206.09	0.00	26.00	73.03	0.00	0.00
<u>S. crameri</u>	0.00	0.00	0.00	0.00	24.00	56.43
<u>S. diploproa</u>	0.00	0.00	0.00	0.00	198.00	2,613.87
<u>S. elongatus</u>	0.00	4.03	0.00	0.91	0.00	0.00
<u>S. entomelas</u>	0.00	0.00	0.00	0.00	24.00	0.00
<u>S. flavidus</u>	67.83	0.00	0.00	12.70	0.00	0.00
<u>S. helvomaculatus</u>	0.00	0.00	0.00	8.16	0.00	26.94
<u>S. paucispinis</u>	1,233.91	0.00	24.00	0.00	20.00	0.00
<u>S. pinniger</u>	67.83	3.73	8.00	0.00	0.00	0.00
<u>S. proriger</u>	67.83	0.00	6.00	42.64	0.00	6.08
<u>S. reedi</u>	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. ruberrimus</u>	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. zacentrus</u>	370.43	0.00	12.00	314.79	54.00	95.53
Total	2,068.70	7.76	82.00	460.39	806.00	3,232.31

Table 12 (cont'd)

Haul #	Can. 51	U.S. 32	Can. 52	U.S. 31	Can. 53	U.S. 29
<u>S. aleutianus</u>	0.00	29.94	0.00	0.00	0.00	0.00
<u>S. alutus</u>	354.00	0.00	12.00	0.00	1,296.00	977.04
<u>S. aurora</u>	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. babcocki</u>	0.00	0.00	0.00	0.00	10.00	0.45
<u>S. borealis</u>	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. brevispinis</u>	14.00	2.27	4.00	78.83	0.00	15.42
<u>S. crameri</u>	0.00	3.63	0.00	0.00	70.00	0.00
<u>S. diploproa</u>	0.00	0.09	0.00	0.00	0.00	3.26
<u>S. elongatus</u>	4.00	5.44	0.00	1.18	10.00	1.81
<u>S. entomelas</u>	6.00	0.00	0.00	0.00	10.00	1.81
<u>S. flavidus</u>	0.00	3.63	0.00	2.72	0.00	0.00
<u>S. helvomaculatus</u>	0.00	0.00	0.00	0.00	0.00	15.88
<u>S. paucispinis</u>	0.00	0.00	0.00	23.59	0.00	0.00
<u>S. pinniger</u>	6.00	3.63	8.00	5.44	0.00	0.00
<u>S. proriger</u>	4.00	51.71	0.00	0.00	0.00	6.62
<u>S. reedi</u>	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. ruberrimus</u>	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. zacentrus</u>	164.00	1.18	10.00	0.00	240.00	250.74
Total	552.00	101.52	34.00	111.76	1,636.00	1,273.03

Table 12 (cont'd)

Haul #	Can. 54	U.S. 30	Can. 55	U.S. 35	Can. 56	U.S. 36
<i>S. aleutianus</i>	0.00	14.88	8.00	0.00	0.00	28.86
<i>S. alutus</i>	1,874.00	304.05	270.00	0.00	102.00	5.50
<i>S. aurora</i>	0.00	0.00	0.00	0.00	0.00	2.34
<i>S. babcocki</i>	0.00	1.42	0.00	0.00	0.00	0.00
<i>S. borealis</i>	0.00	0.00	14.00	0.00	32.00	0.00
<i>S. brevispinis</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>S. crameri</i>	382.00	49.61	12.00	0.00	2.00	0.00
<i>S. diploproa</i>	0.00	36.14	0.00	0.00	0.00	0.00
<i>S. elongatus</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>S. entomelas</i>	0.00	2.83	0.00	0.00	0.00	0.00
<i>S. flavidus</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>S. helvomiculatus</i>	0.00	2.13	0.00	0.00	0.00	0.00
<i>S. paucispinis</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>S. pinniger</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>S. proriger</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>S. reedi</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>S. ruberrimus</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>S. zacentrus</i>	144.00	0.00	14.00	0.00	2.00	0.00
Total	2,400.00	411.06	318.00	0.00	138.00	36.70

Table 13. Biomass estimates (t) by locality and depth interval from the M/V HOME BAY, September, 1985. Biomass was calculated using a K_d value of .056271 (the area swept by the doors in one hour), and presented with a 95% confidence interval. Confidence intervals are minimum estimates only, and are weighted by a ratio of area fished (m^2) to area surveyed (m^2). Biomass estimates lacking a confidence interval are point estimates only. U.S. hauls were not included in calculations for Cape Flattery south.

Locality	Estevan north					Estevan south				
	160-220	221-275	276-330	331-384	385-439	160-220	221-275	276-330	331-384	
<u>S. aleutianus</u>	-	-	-	3.26±411	11.58±426	-	8.99	-	8.09±245	
<u>S. alutus</u>	61.34±49	22.42±214	42.60±94	14.04±186	3.64±32	1.19±429	28.89	15.38±115	23.21±138	
<u>S. babcocki</u>	4.07±423	8.85±253	3.17±73	2.30±218	.89±361	7.84±151	11.97	1.31±162	2.6±183	
<u>S. borealis</u>	-	-	.24±245	7.81±208	3.50±431	-	-	-	-	
<u>S. brevispinis</u>	8.64±129	1.80±240	-	-	-	14.88±404	40.83	.34±341	-	
<u>S. crameri</u>	1.49±462	-	2.37±85	.68±119	1.05±429	.96±442	-	1.76±143	2.36±108	
<u>S. diploproa</u>	.55±426	13.19±159	9.41±92	3.59±23	1.23±302	1.42±24	-	6.86±98	1.92±44	
<u>S. elongatus</u>	14.48±372	-	-	-	-	.73±465	8.99	-	-	
<u>S. entomelas</u>	-	-	-	.39±314	-	-	-	.24±320	-	
<u>S. flavidus</u>	-	-	-	-	-	-	-	-	-	
<u>S. helvosciculatus</u>	1.98±233	-	-	-	-	-	-	-	-	
<u>S. paucispinis</u>	1.03±444	2.47±249	.71±102	.28±296	-	-	8.99	.34±341	-	
<u>S. plinniger</u>	-	-	-	-	-	2.59±426	-	.34±341	-	
<u>S. proriger</u>	3.78±303	-	-	-	-	18.67±421	-	.24±320	-	
<u>S. reedf</u>	-	-	-	-	-	.68±375	46.81	-	-	
<u>S. zacentrus</u>	34.15±429	3.28±77	.12±250	-	-	.68±375	95.57	-	-	
Total	131.51±123	52.01±110	58.62±70	32.35±105	21.89±238	49.64±202	251.04	26.81±72	38.18±100	
# of hauls	2	3	5	3	2	2	1	3	2	

Table 13 (cont'd)

Locality	Clayoquot north			Clayoquot south			Deep Big Bank north	
	221-275	276-330	160-220	221-275	276-330	331-384	160-220	221-275
<u>S. aleutianus</u>	-	-	-	-	-	48.66	-	-
<u>S. alutus</u>	6.67	6.60	196.18±17	148.65±112	98.62±69	97.95	313.39	13.25
<u>S. babcocki</u>	.23	-	4.47±215	.67±147	3.41±427	1.32	4.93	4.10
<u>S. borealis</u>	-	-	-	-	-	6.06	-	-
<u>S. brevispinis</u>	.46	-	15.19±162	2.16±122	-	-	-	-
<u>S. crameri</u>	.34	1.07	1.98±324	.45±219	12.28±339	3.28	-	-
<u>S. diploproa</u>	7.11	1.58	17.97±172	9.15±79	37.37±54	.67	29.41	30.47
<u>S. elongatus</u>	-	-	1.01±319	.18±189	-	-	-	-
<u>S. entomelas</u>	-	-	-	-	-	-	-	-
<u>S. flavidus</u>	-	-	17.01±320	2.4±150	-	-	-	-
<u>S. helveticus</u>	-	-	-	-	.46±442	-	-	-
<u>S. paucispinis</u>	.46	-	5.66±320	1.17±197	2.53±431	-	2.48	-
<u>S. pinniger</u>	-	-	6.21±309	.60±276	-	-	-	-
<u>S. proriger</u>	.57	-	52.59±286	1.99±164	-	-	-	-
<u>S. reedii</u>	-	-	47.45±319	1.78±184	1.66±439	-	7.37	-
<u>S. zacentrus</u>	1.90	-	34.28±218	13.91±99	-	-	107.75	4.47
Total	17.74	9.25	400.00±60	183.11±91	156.33±54	157.94	465.33	52.29
# of hauls	1	1	3	5	2	1	1	1

Table 13 (cont'd)

Locality	Deep Big Bank south				Cape Flattery south			
	160-220	221-275	276-330	331-384	160-220	221-275	276-330	
<u>S. aleutianus</u>	-	-	-	-	-	-	-	-
<u>S. alutus</u>	16.36±102	85.66±100	84.82±111	39.58±41	32.93±253	130.30±139	378.34	-
<u>S. babcocki</u>	1.20±313	1.00±440	6.56±128	4.17±342	7.68±432	2.26±160	8.86	-
<u>S. borealis</u>	-	-	2.27±313	-	-	-	-	-
<u>S. brevispinis</u>	22.12±281	-	.65±302	-	90.15±430	-	-	-
<u>S. crameri</u>	-	-	7.42±214	3.42±119	-	0.72±160	6.48	-
<u>S. diploproa</u>	.39±238	3.23±99	14.45±43	5.48±303	0.94±435	16.30±94	45.73	-
<u>S. elongatus</u>	3.95±306	.48±420	-	-	9.95±129	1.51±101	-	-
<u>S. entomelas</u>	-	.82±439	-	-	-	0.19±208	-	-
<u>S. flavidus</u>	-	-	-	-	-	-	-	-
<u>S. helvomiculatus</u>	.20±476	-	0.62±314	-	4.22±428	0.10±208	-	-
<u>S. paucispinis</u>	-	4.48±427	-	-	167.87±386	0.69±249	-	-
<u>S. pinniger</u>	.20±476	-	-	-	-	6.17±57	-	-
<u>S. proriger</u>	8.63±290	4.04±434	0.30±333	-	30.15±93	-	-	-
<u>S. reedi</u>	-	-	-	-	14.75±332	6.72±116	-	-
<u>S. zacentrus</u>	1.50±248	2.00±240	2.46±211	-	53.02±291	10.28±67	21.72	-
Total	54.55±129	101.71±88	119.55±80	52.65±52	417.65±52	169.02±108	461.13	
# of hauls	3	2	3	2	2	5	1	

Table 14. Biomass estimates (t) by locality from the M/V HOWE BAY, September, 1985. Biomass was calculated using a K_a value of .056271 (the area swept by the doors in one hour), and presented with a 95% confidence interval. Confidence intervals are minimum estimates only, and are weighted by a ratio of area fished (nm^2) to area surveyed (nm^2). Biomass estimates lacking a confidence interval are point estimates only. U.S. hauls were not included in calculations for Cape Flattery south.

Locality	Estevan north	Estevan south	Clayoquot north	Clayoquot south	Deep Big Bank north	Deep Big Bank south	Cape Flattery south
Depth (m)	160-439	160-384	221-330	160-384	160-275	160-384	160-330
<i>S. aleutianus</i>	14.84±46%	17.08±43%	13.27	48.66	-	-	-
<i>S. alutus</i>	144.04±128%	68.67±93%	.23	541.40±107%	326.64	226.42±60%	541.57±163%
<i>S. babcocki</i>	19.28±141%	23.72±68%	-	9.87±141%	9.03	12.93±144%	18.87±286%
<i>S. borealis</i>	11.55±86%	-	-	6.06	-	2.27±85%	-
<i>S. brevispinis</i>	10.44±66%	56.05±38%	.46	17.35±104%	-	22.65±157%	90.15±108%
<i>S. crameri</i>	5.59±101%	5.08±108%	1.41	17.99±110%	-	10.84±71%	7.2 ±190%
<i>S. diptoproa</i>	27.97±108%	10.20±97%	8.69	65.16±113%	59.88	23.55±77%	62.97±212%
<i>S. elongatus</i>	14.48±24%	9.72±65%	-	1.19±216%	-	4.43±148%	11.46±120%
<i>S. entomelas</i>	.39±27%	.24±116%	-	-	-	.82±38%	.19±277%
<i>S. flavidus</i>	-	-	-	19.41±169%	-	-	-
<i>S. helvomiculatus</i>	1.98±14%	-	-	.46±35%	-	.82±168%	4.32±158%
<i>S. paucispinis</i>	4.49±140%	9.33±113%	.46	9.36±220%	2.48	4.48±39%	168.56±199%
<i>S. pinniger</i>	-	2.93±162%	-	6.81±199%	-	.20±76%	6.17±15%
<i>S. proriger</i>	3.78±19%	18.91±124%	.57	54.58±150%	-	12.97±182%	30.15±23%
<i>S. reed</i>	-	47.49±56%	-	50.89±240%	7.37	-	21.47±222%
<i>S. zacentrus</i>	37.55±140%	96.25±56%	1.90	48.19±82%	112.22	5.96±133%	85.02±148%
Total	296.38±72%	365.67±52%	26.99	914.99±113%	517.62	328.34±47%	1048.03±107%
# of hauls	15	8	2	11	2	10	8

Table 15. Rockfish biomass estimates (t) by locality and depth, M/V ARCTIC HARVESTER, September, 1979.

Locality	Estevan North			Estevan South			Clayoquot North		Clayoquot South	
	183-237	238-290	291-365	183-237	238-290	291-365	183-365	183-237	238-290	
Depth (m)										
<u>S. aleutianus</u>	0.00	0.00	20.54	0.00	9.61	1.98	9.58	235.38	13.03	
<u>S. alutus</u>	108.32	641.69	195.60	18.12	37.37	114.60	136.13	310.77	466.42	
<u>S. babcocki</u>	4.64	7.03	11.18	65.00	3.32	5.46	9.00	1.42	20.69	
<u>S. borealis</u>	0.00	0.00	97.13	0.00	0.00	3.25	0.00	0.00	1.07	
<u>S. brevispinis</u>	0.75	0.00	0.00	12.95	0.00	0.00	3.36	3.30	0.00	
<u>S. crameri</u>	0.00	3.84	19.14	7.08	1.01	1.79	0.00	0.00	12.30	
<u>S. diploproa</u>	0.00	187.41	100.68	0.00	7.98	35.34	9.45	57.71	278.22	
<u>S. elongatus</u>	12.58	0.00	0.00	9.49	0.00	1.32	0.50	5.47	0.00	
<u>S. entomelas</u>	0.00	0.00	0.00	8.63	0.00	0.00	0.00	0.00	0.00	
<u>S. flavidus</u>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<u>S. helvomaculatus</u>	6.20	0.00	0.00	3.45	0.00	0.00	1.97	1.58	0.00	
<u>S. paucispinis</u>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<u>S. pinniger</u>	0.29	0.00	0.00	9.98	0.00	0.00	1.01	1.58	0.00	
<u>S. proriger</u>	25.50	0.00	0.00	89.75	0.00	0.00	2.02	0.00	0.00	
<u>S. reedi</u>	0.00	0.00	0.00	0.00	0.00	0.00	132.71	0.00	0.00	
<u>S. zacentrus</u>	14.83	3.14	0.00	7.77	0.00	0.00	16.06	16.12	0.00	
Total	173.11	843.11	444.27	232.22	59.29	163.74	321.79	633.33	791.73	
# of Hauls	2	5	5	2	2	3	2	4	3	

Table 15 (cont'd)

Locality	Deep Big Bank North		Deep Big Bank South		Cape Flattery North		Cape Flattery South	
	183-365	183-237	238-290	291-365	183-365	183-237	238-290	291-365
<u>S. aleutianus</u>	17.98	0.00	0.00	2.53	0.00	0.00	1.56	0.00
<u>S. alutus</u>	55.79	290.23	251.72	211.85	17.04	67.82	275.39	1,018.02
<u>S. babcocki</u>	5.84	1.04	5.13	14.55	0.70	2.48	0.55	0.00
<u>S. borealis</u>	18.49	0.00	1.14	11.13	0.00	0.00	6.00	0.00
<u>S. brevispinis</u>	0.00	4.26	0.00	0.00	0.00	9.20	0.00	0.00
<u>S. crameri</u>	0.00	0.00	2.33	93.08	0.00	0.00	0.00	7.81
<u>S. diploproa</u>	62.01	14.21	125.74	57.68	21.71	0.00	186.00	62.49
<u>S. elongatus</u>	0.00	12.24	0.00	0.00	0.00	0.71	0.00	0.00
<u>S. entomelas</u>	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.00
<u>S. flavidus</u>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. helvomaculatus</u>	1.52	4.32	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. paucispinis</u>	0.00	0.00	0.00	0.00	0.00	347.85	2.77	0.00
<u>S. plinniger</u>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. proriger</u>	0.00	8.63	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. reedi</u>	0.00	0.00	0.00	0.00	0.00	47.37	0.00	0.00
<u>S. zacentrus</u>	23.76	0.00	4.61	0.00	0.00	10.26	0.00	10.41
						4.95	2.12	13.02
Total	185.39	334.93	390.67	390.82	39.45	490.64	475.24	1,111.75
# of Hauls	2	3	3	2	1	2	3	1

Table 16. Rockfish biomass estimates (t) by locality, M/V ARCTIC HARVESTER, September 1979.

Locality	Estevan North	Estevan South	Clayoquot North	Clayoquot South	Deep Big Bank North	Deep Big Bank South	Cape Flattery North	Cape Flattery South
Depth (m)	183-365	183-365	183-365	183-365	183-365	183-365	183-365	183-365
<u>S. aleutianus</u>	20.54	11.59	9.58	248.41	17.98	2.53	0.00	1.58
<u>S. alutus</u>	945.61	170.09	136.13	777.19	55.79	753.8	17.04	1361.23
<u>S. babcocki</u>	22.85	73.78	9	22.11	5.84	20.72	0.7	3.03
<u>S. borealis</u>	97.13	3.25	0.00	1.07	18.49	12.27	0.00	6
<u>S. brevispinis</u>	0.75	12.95	3.36	3.3	0.00	4.26	0.00	9.2
<u>S. crameri</u>	22.98	9.88	0.00	12.3	0.00	95.41	0.00	7.81
<u>S. diplopora</u>	288.09	43.32	9.45	335.93	62.01	197.63	21.71	248.49
<u>S. elongatus</u>	12.58	10.81	0.5	5.47	0.00	12.24	0.00	0.71
<u>S. entomelas</u>	0.00	8.63	0.00	0.00	0.00	0.00	0.00	0.83
<u>S. flavidus</u>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>S. helvomaculatus</u>	6.2	3.45	1.97	1.58	1.52	4.32	0.00	0.00
<u>S. paucispinis</u>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	350.62
<u>S. pinniger</u>	0.29	9.98	1.01	1.58	0.00	0.00	0.00	0.00
<u>S. proriger</u>	25.5	89.75	2.02	0.00	0.00	8.63	0.00	47.37
<u>S. reedi</u>	0.00	0.00	132.71	0.00	0.00	0.00	0.00	20.67
<u>S. zacentrus</u>	17.97	7.77	16.06	16.12	23.76	4.61	0.00	20.09
Total	1460.49	455.25	321.79	1425.06	185.39	1116.42	39.45	2077.63
# of Hauls	12	7	2	7	2	8	1	6

Table 17. Biomass estimates (t) for rockfishes from the M/V ARCTIC HARVESTER, September 1979, and the M/V HOWE BAY, September, 1985. Estimates for the HOWE BAY include only hauls 1-46, and 58-68, i.e. those hauls which replicate hauls by the ARCTIC HARVESTER in September, 1979, and are presented with a 95% confidence interval. Confidence intervals are minimum estimates only, and are weighted by a ratio of area fished (nm^2) to area surveyed (nm^2).

Cruise	ARCTIC HARVESTER	HOWE BAY
Depth range (m)	183-365	160-439
Number of tows	45	56
<i>S. aleutianus</i>	312.21	80.58 $\pm$ 70%
<i>S. alutus</i>	4,216.88	1,862.01 $\pm$ 17%
<i>S. babcocki</i>	158.03	93.86 $\pm$ 46%
<i>S. borealis</i>	138.21	19.88 $\pm$ 167%
<i>S. brevispinis</i>	33.82	197.22 $\pm$ 202%
<i>S. crameri</i>	148.38	48.11 $\pm$ 99%
<i>S. diploproa</i>	1,206.63	258.42 $\pm$ 20%
<i>S. elongatus</i>	42.31	41.28 $\pm$ 176%
<i>S. entomelas</i>	9.46	1.64 $\pm$ 238%
<i>S. flavidus</i>	0.00	19.41 $\pm$ 283%
<i>S. helvomaculatus</i>	19.04	7.58 $\pm$ 249%
<i>S. paucispinis</i>	350.62	199.16 $\pm$ 326%
<i>S. pinniger</i>	12.86	16.11 $\pm$ 138%
<i>S. proriger</i>	173.27	120.96 $\pm$ 162%
<i>S. reedi</i>	153.38	127.22 $\pm$ 188%
<i>S. zacentrus</i>	106.38	387.09 $\pm$ 109%
Total	7,081.48	3,480.53 $\pm$ 28%

Table 18. Sebastes alutus catch by sex and fork length from the M/V HOWE BAY, September, 1985. Catch includes only hauls 1-46 and 58-68, i.e. those which replicate hauls by the ARCTIC HARVESTER in September, 1979. M=males, F=females.

Fork length (cm)	Catch weight (kg)			Number of fish		
	M	F	M+F	M	F	M+F
20	0.00	0.00	0.00	0	0	0
21	0.00	1.67	1.67	0	14	14
22	0.00	0.00	0.00	0	0	0
23	2.36	0.00	2.36	14	0	14
24	0.00	2.57	2.57	0	14	14
25	3.05	2.93	5.98	14	14	28
26	0.00	3.32	3.32	0	14	14
27	11.57	7.48	19.05	42	28	70
28	8.62	12.58	21.20	28	42	70
29	23.99	9.38	33.37	70	28	98
30	79.86	15.66	95.52	209	42	251
31	88.31	69.48	157.78	209	167	376
32	149.25	134.45	283.70	320	292	612
33	156.88	176.45	333.33	306	348	654
34	187.54	217.22	404.76	334	390	724
35	358.68	306.13	664.81	585	501	1086
36	642.41	251.03	893.44	961	376	1337
37	1296.12	263.65	1559.77	1782	362	2144
38	2109.77	474.46	2584.23	2673	599	3272
39	2463.10	694.85	3157.95	2882	808	3690
40	2443.25	1401.88	3845.13	2646	1504	4150
41	1151.23	1979.13	3130.36	1156	1963	3119
42	567.48	2075.50	2642.98	529	1908	2437
43	224.71	1632.19	1856.90	195	1392	1587
44	17.22	1211.27	1228.49	14	961	975
45	0.00	753.99	753.99	0	557	557
46	0.00	262.71	262.71	0	181	181
47	0.00	108.17	108.17	0	70	70
48	0.00	92.50	92.50	0	56	56
49	0.00	0.00	0.00	0	0	0
50	0.00	0.00	0.00	0	0	0
Total	11,985	12,161	24,146	14,968	12,629	27,597

Table 19. Sebastes alutus catch by sex and fork length from the M/V ARCTIC HARVESTER, September, 1979. M = males, F = females.

Fork length (cm)	Catch weight (kg)			Number of fish		
	M	F	M+F	M	F	M+F
20	0.00	0.00	0.00	0	0	0
21	5.33	2.52	7.85	42	21	63
22	3.08	2.92	6.00	21	21	42
23	7.05	6.73	13.78	42	42	84
24	0.00	7.70	7.70	0	42	42
25	9.10	8.76	17.86	42	42	84
26	10.27	0.00	10.27	42	0	42
27	34.57	39.11	73.68	125	146	271
28	51.53	43.89	95.42	167	146	313
29	136.29	77.08	213.37	395	229	624
30	143.26	117.02	260.28	375	312	687
31	290.41	242.34	532.75	687	583	1270
32	349.19	133.99	483.18	749	291	1040
33	767.46	379.81	1147.27	1499	749	2248
34	1740.40	510.24	2250.64	3101	916	4017
35	2987.21	1182.17	4168.38	4870	1936	6806
36	5817.38	2334.84	8152.22	8700	3497	12197
37	8264.49	3956.19	12220.68	11364	5432	16796
38	9280.52	4783.20	14063.72	11760	6036	17796
39	6741.26	6823.02	13564.28	7888	7930	15818
40	4767.12	7994.19	12761.31	5162	8575	13737
41	2757.57	6986.95	9944.52	2768	6931	9699
42	1450.99	6250.29	7701.28	1353	5745	7098
43	695.78	5489.61	6185.39	604	4683	5287
44	411.91	4172.34	4584.25	333	3309	3642
45	0.00	3719.37	3719.37	0	2747	2747
46	0.00	3171.89	3171.89	0	2185	2185
47	0.00	1584.56	1584.56	0	1020	1020
48	0.00	1106.17	1106.17	0	666	666
49	0.00	221.40	221.40	0	125	125
50	0.00	0.00	0.00	0	0	0
Total	46,722	61,348	108,070	62,087	64,356	126,442

Table 20. Comparison of sampling allocation to stratum area (square nautical miles), mean catch rates (kg/hr), and coefficients of variation by locality and depth interval (m) for the M/V HOWE BAY, September, 1985.

Locality	Depth interval	# of hauls	Area	Rockfish catch rate	C.V.	<u>S. alutus</u> catch rate	C.V.
Estevan north	160-220	2	64.4	114.36	.129	53.59	.227
	221-275	3	20.3	143.79	.465	62.15	2.019
	276-330	5	8.1	408.78	.236	295.90	1.820
	331-384	3	7.6	238.83	.372	103.92	1.747
	385-439	2	7.2	170.58	.155	28.40	.139
Estevan south	160-220	2	47.6	58.14	.418	1.40	1.980
	221-275	1	30.8	458.24	-	52.78	-
	276-330	3	10.8	139.06	.303	80.12	1.084
	331-384	2	15.9	133.32	.421	82.11	.642
Clayoquot north	221-275	1	7.8	127.20	-	48.05	-
	276-330	1	5.8	89.51	-	63.98	-
Clayoquot south	160-220	3	60.0	374.49	.140	183.99	.159
	221-275	5	18.4	599.19	.361	454.57	2.078
	276-330	2	22.7	387.07	.100	244.45	.319
	331-384	1	12.4	716.30	-	444.49	-
Deep Big Bank north	160-220	1	28.7	912.30	-	614.45	-
	221-275	1	7.0	420.20	-	106.50	-
Deep Big Bank south	160-220	3	52.2	58.75	.301	17.63	.936
	221-275	2	22.4	255.39	.070	215.17	.465
	276-330	3	18.2	369.47	.187	262.22	1.044
	331-384	2	8.8	336.51	.041	253.06	.189
Cape Flattery south	160-220	2	32.8	716.73	.147	56.48	1.181
	221-275	5	10.7	888.80	.388	685.23	2.701
	276-330	1	16.6	1562.34	-	1282.48	-

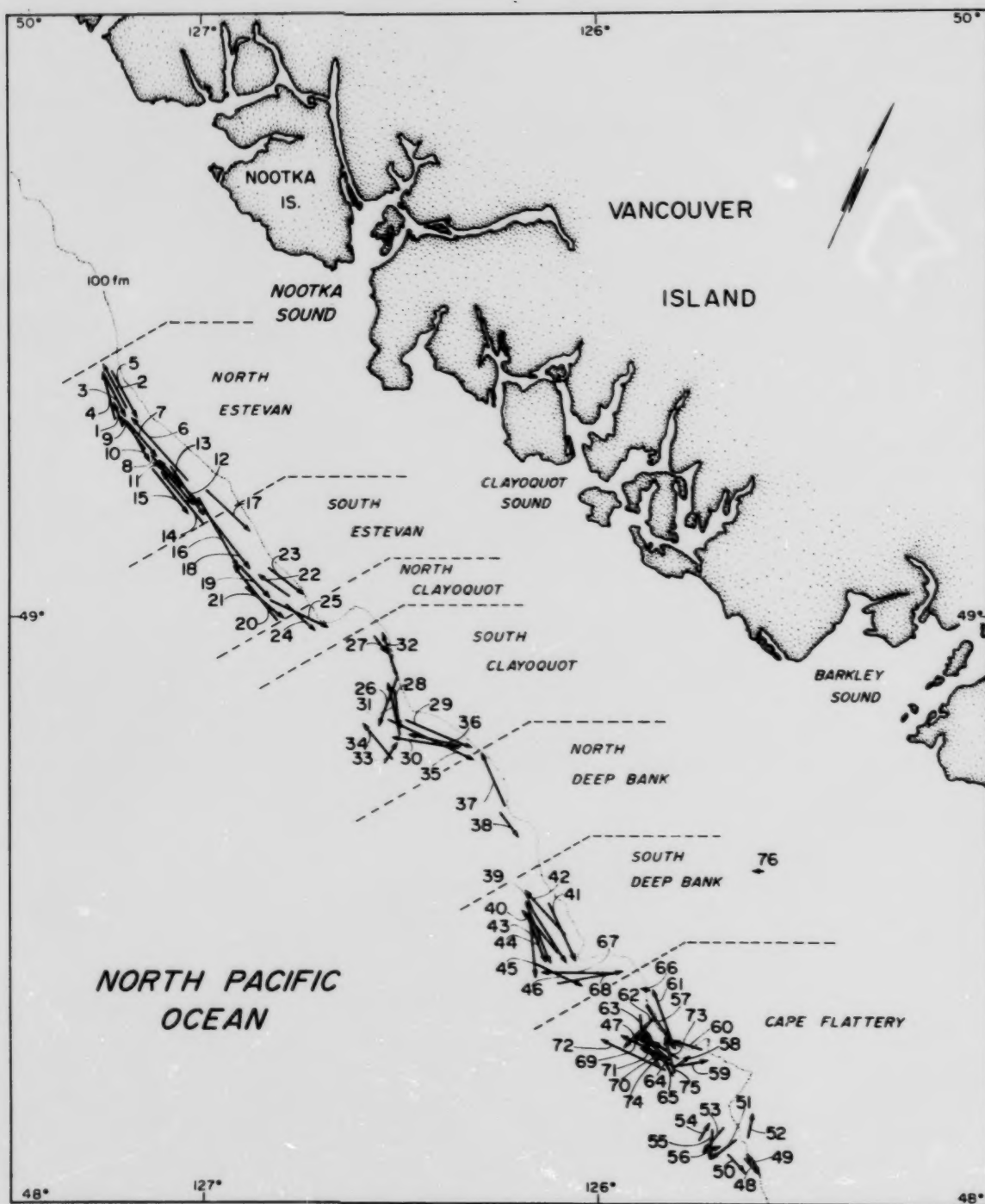


Fig. 1. Haul locations off the southwest coast of Vancouver Island, M/V HOWE BAY, September 1985.

S. alutus catch by length

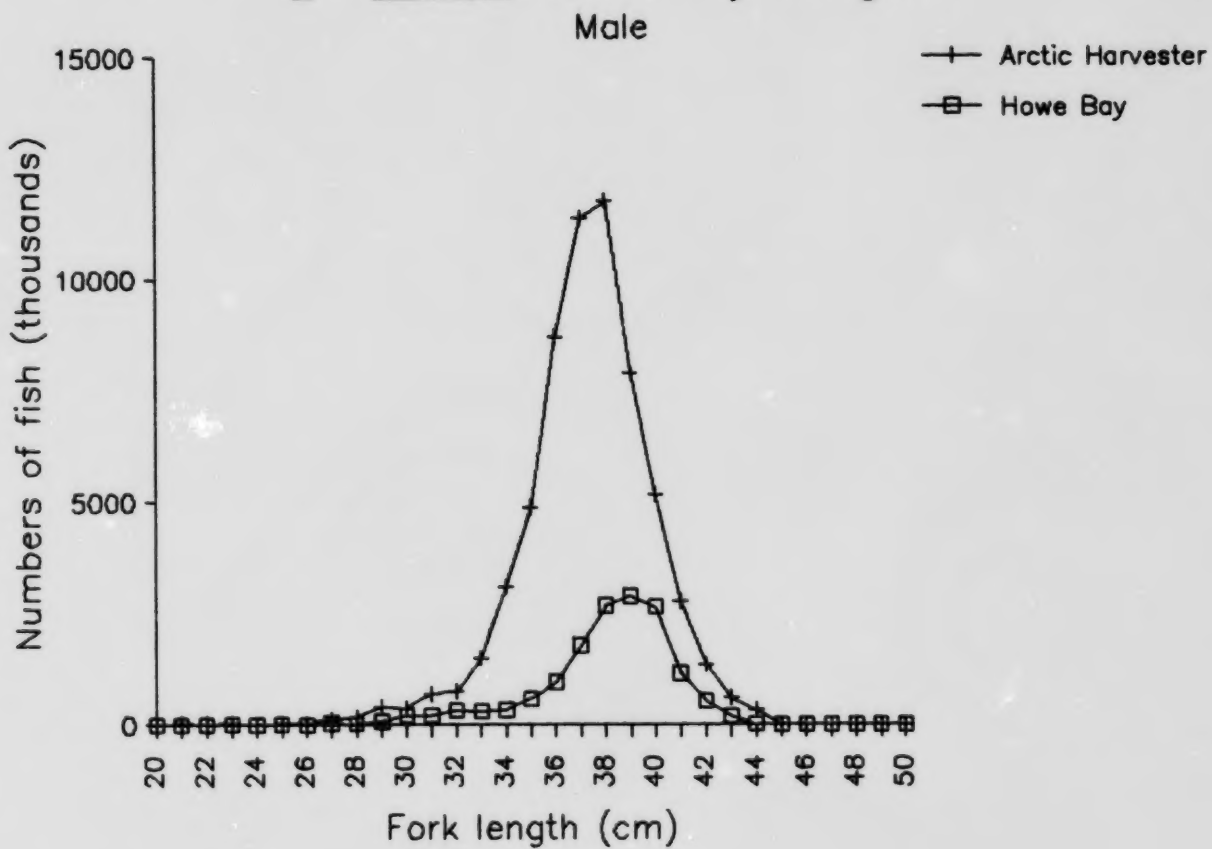


Fig. 2. Size frequency of male S. alutus caught by the M/V ARCTIC HARVESTER in 1979, and the M/V HOWE BAY in 1985.

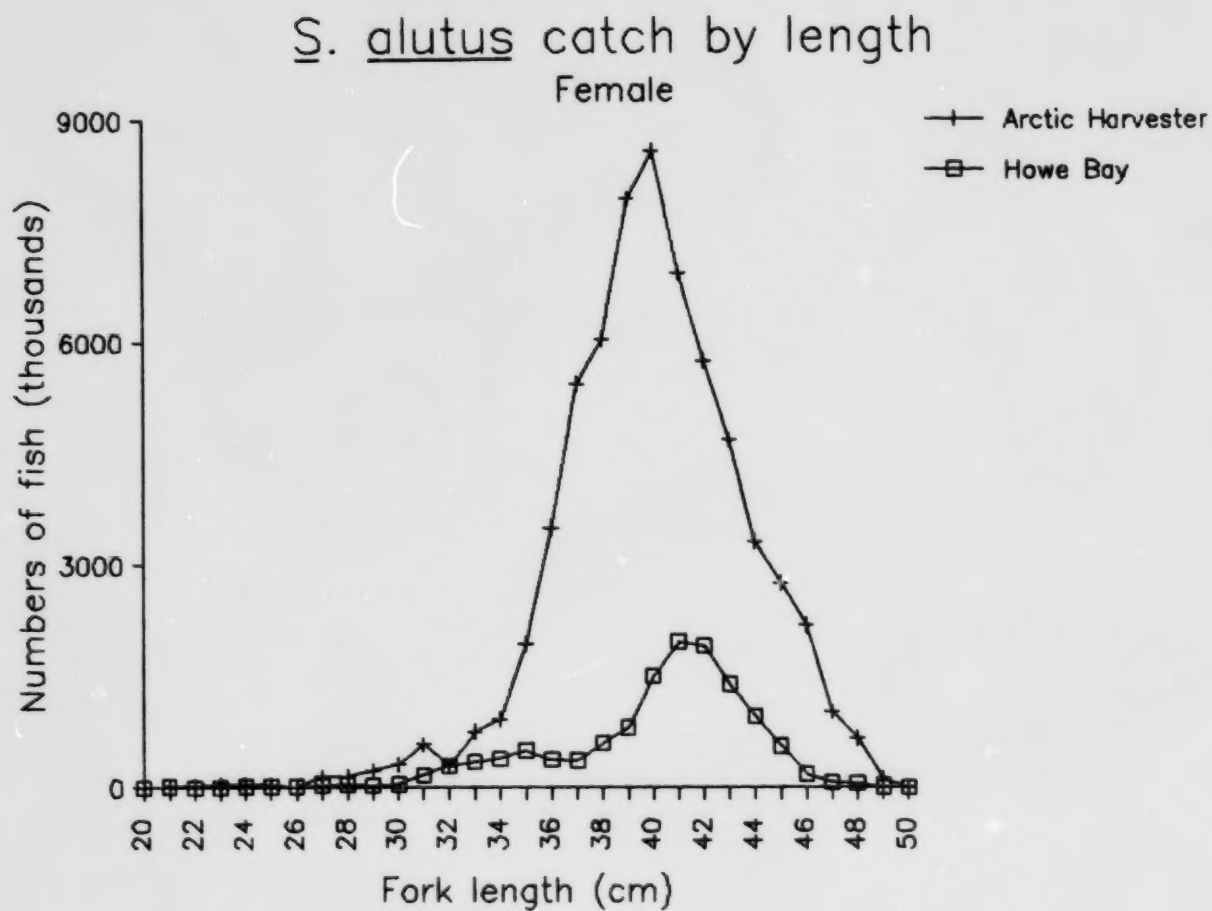


Fig. 3. Size frequency of female S. alutus caught by the M/V ARCTIC HARVESTER in 1979, and by the M/V HOWE BAY in 1985.

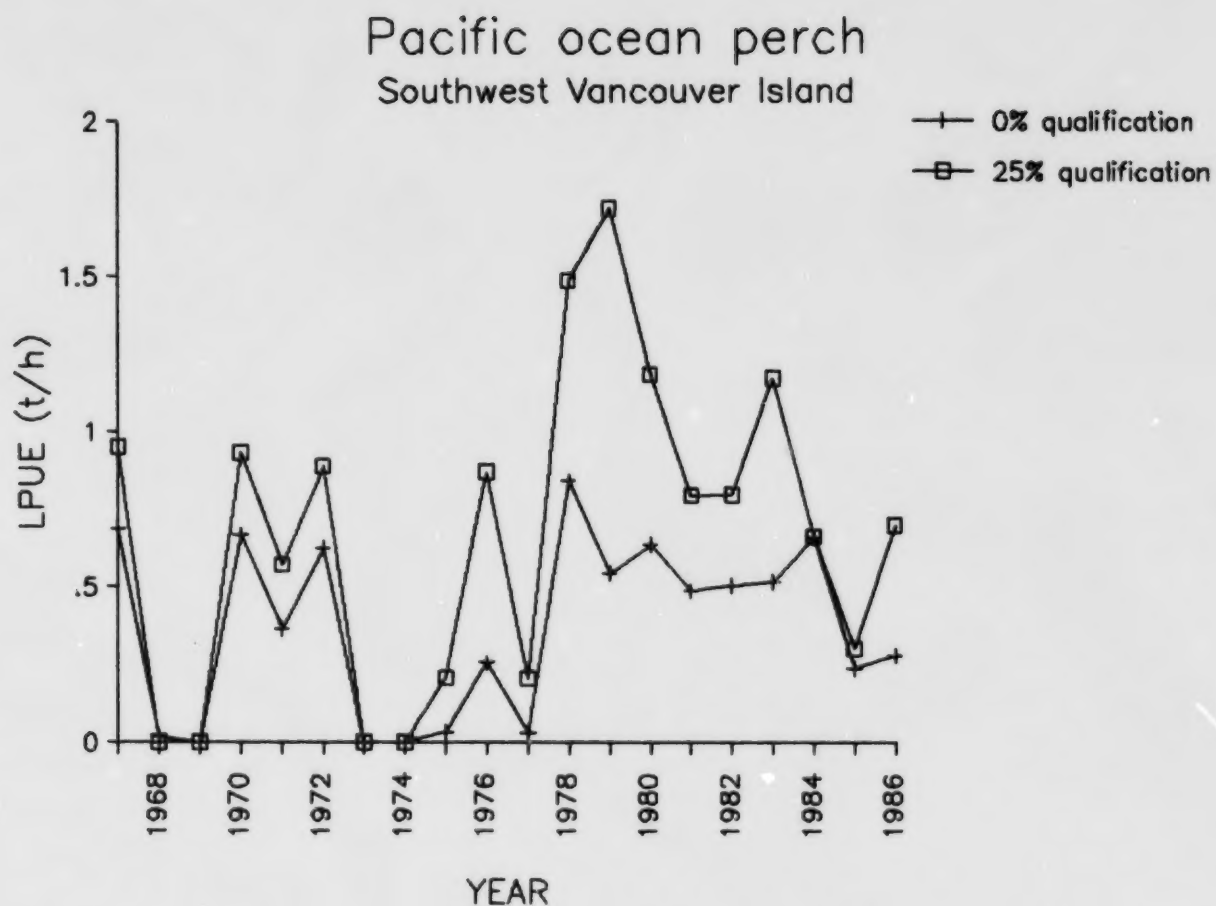


Fig. 4. Commercial catch rates (landings (t) per unit effort) of *S. alutus* off the southwest coast of Vancouver Island, 1967 through 1986. Twenty-five percent qualification includes only catches where 25% of the total catch weight was *S. alutus*.

Appendix Table 1. Vessel Specifications.

Vessel: M/V HOWE BAY	Crew (Total): 6
Skipper: Capt. Al Spence	Fish Storage: 41,000 kg freezer hold 2 x 10,000 kg champagne system holds
Gross Tons: 185	
Overall Length: 28 m (92 ft)	
Horsepower: 700	
Trawl Gear: Double gear and two single winches Hydraulic seine net reel	
<u>Electronic Aids:</u>	
Plotter: Furuno GD-170 video plotter	
Radar: Furuno 36, Sitex-Koden 48	
Autopilot: Wagner	
Radio: Sitex FMX-84 (UHF), Daniels DE-1100 (SSB)	

Appendix Table 2. Net characteristics and estimated trawl door spread for the Atlantic Western IIA net.

Headrope Length:	45.0 ft.
Footrope Length:	107.0 ft.
Wing/Bridle Length:	90.0 ft.
Sweep Length:	0.0 ft.
Catenary Parameter:	850.0
Estimated Door Spread:	114.0 ft.
Swept Area (1 hr., doors):	0.5627 sq. naut. mi.

APPENDIX TABLE 3 Rockfish biomass survey off the southwest coast of Vancouver Island, M/V HOWE BAY, September 7-23, 1985. (see footnotes for explanation of terms)

Haul Number	1	2	3	4
Date	SEP 8	SEP 8	SEP 8	SEP 8
Area (Major, Minor)	3D,25	3D,25	3D,25	3D,25
Start Time (PST)	8:56	12:00	14:29	16:59
Duration (Min)	35	106	101	103
Start N. Lat. (Deg)	49	49	49	49
(Min)	19.6	20.1	24.7	20.4
W. Long (Deg)	127	127	127	127
(Min)	12.1	12.4	15.1	13.2
Finish N. Lat. (Deg)	49	49	49	49
(Min)	21.2	25.3	20.2	25.0
W. Long (Deg)	127	127	127	127
(Min)	13.6	15.0	12.6	15.7
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0	0.0
Direction (Deg.True)	292	300	145	220
Bottom Depth (M)	324- 296	326- 326	256- 329	366- 384
(Fm)	177- 162	178- 178	140- 180	200- 210
Modal Depth (M)	..	302	338	402
Gear Type	22	22	22	22
Tide	SLACK	EBB	SLACK	FLOOD
Total Catch (Kg)	453	1423	560	548
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	1	2	3	4
Date	SEP 8	SEP 8	SEP 8	SEP 8
Area (Major, Minor)	3D,25	3D,25	3D,25	3D,25
ARROWTOOTH FLOUNDER	8	18	13	5
DOVER SOLE	23	11	15	15
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	6	4	5	10
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	..	..	298
<u>S. ALUTUS</u>	126	533	100	52
<u>S. BABCOCKI</u>	25	32	..	2
<u>S. BOREALIS</u>	..	14	..	..
<u>S. BREVISPINIS</u>	..	..	..	..
<u>S. CRAMERI</u>	15	56	3	..
<u>S. DIPLOPROA</u>	69	102	41	5
<u>S. ELONGATUS</u>	..	..	..	..
<u>S. ENTOMELAS</u>	..	..	..	..
<u>S. FLAVIDUS</u>	..	..	..	..
<u>S. HELVOMACULATUS</u>	..	..	..	..
<u>S. PAUCISPINIS</u>	6	11	10	..
<u>S. PINNIGER</u>	..	..	..	..
<u>S. PRORIGER</u>	..	..	..	..
<u>S. REEDI</u>	..	..	..	..
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	..	..	..	..
<u>SEB. ALASCANUS</u>	10	7	3	7
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	2	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	121	599	362	118
SABLEFISH	42	25	5	34
WALLEYE POLLOCK	..	..	..	..
OTHER ROUND FISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	..	..	..	..
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	..	11	3	2
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	453	1423	560	548

APPENDIX TABLE 3 (CONTINUED)

Haul Number	5	6	7	8
Date	SEP 8	SEP 9	SEP 9	SEP 9
Area (Major, Minor)	3D,25	3D,25	3D,25	3D,25
Start Time (PST)	19:30	7:46	11:05	14:08
Duration (Min)	120	142	124	123
Start N. Lat. (Deg)	49	49	49	49
(Min)	25.9	14.3	20.3	12.5
W. Long (Deg)	127	127	127	127
(Min)	14.2	2.9	12.1	2.2
Finish N. Lat. (Deg)	49	49	47	49
(Min)	20.0	20.8	15.9	17.2
W. Long (Deg)	127	127	127	127
(Min)	10.1	11.2	5.6	8.9
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0	0.0
Direction (Deg.True)	90	240	130	0
Bottom Depth (M)	201- 205	212- 214	249- 245	278- 296
(Fm)	110- 112	116- 117	136- 134	152- 162
Modal Depth (M)	..	..	..	..
Gear Type	22	22	22	22
Tide	SLACK	FLOOD	EBB	EBB
Total Catch (Kg)	554	418	285	1887
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	5	6	7	8
Date	SEP 8	SEP 9	SEP 9	SEP 9
Area (Major, Minor)	3D,25	3D,25	3D,25	3D,25
ARROWTOOTH FLOUNDER	2	11	4	17
DOVER SOLE	14	11	1	12
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	9	4	3	12
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	..	..	..
<u>S. ALUTUS</u>	95	141	20	495
<u>S. BABCOCKI</u>	14	..	22	58
<u>S. BOREALIS</u>	..	..	..	..
<u>S. BREVISPINIS</u>	19	13	6	..
<u>S. CRAMERI</u>	5	..	..	17
<u>S. DIPLOPROA</u>	..	2	107	245
<u>S. ELONGATUS</u>	47	4	..	..
<u>S. ENTOMELAS</u>	..	..	..	..
<u>S. FLAVIDUS</u>	..	..	..	..
<u>S. HELVOMACULATUS</u>	5	2	..	..
<u>S. PAUCISPINIS</u>	..	4	7	..
<u>S. PINNIGER</u>	..	..	..	..
<u>S. PRORIGER</u>	2	13	..	..
<u>S. REEDI</u>	..	..	..	..
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	..	141	10	6
<u>SEB. ALASCANUS</u>	7	..	4	29
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	6	..
PACIFIC HAKE	242	..	9	967
SABLEFISH	74	72	85	29
WALLEYE POLLOCK	..	..	..	..
OTHER ROUND FISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	..	..	..	..
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	19	..	1	..
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	554	418	285	1887

APPENDIX TABLE 3 (CONTINUED)

Haul Number	9	10	11	12
Date	SEP 9	SEP 9	SEP 9	SEP 10
Area (Major, Minor)	3D,25	3D,25	3D,25	3D,25
Start Time (PST)	17:09	19:40	23:20	7:17
Duration (Min)	103	115	64	131
Start N. Lat. (Deg)	49	49	49	49
(Min)	16.7	21.1	16.1	12.0
W. Long (Deg)	127	127	127	127
(Min)	7.9	13.7	7.2	1.0
Finish N. Lat. (Deg)	49	49	49	49
(Min)	21.1	16.2	13.7	16.7
W. Long (Deg)	127	127	127	127
(Min)	13.4	8.3	3.2	7.5
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0	0.0
Direction (Deg.True)	222	130	0	220
Bottom Depth (M)	283- 280	329- 384	311- 241	263- 263
(Fm)	155- 153	180- 210	170- 132	144- 144
Modal Depth (M)	..	..	256	..
Gear Type	22	22	22	22
Tide	FLOOD	FLOOD	EBB	FLOOD
Total Catch (Kg)	1992	465	111	1021
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	9	10	11	12
Date	SEP 9	SEP 9	SEP 9	SEP 10
Area (Major, Minor)	3D,25	3D,25	3D,25	3D,25
ARROWTOOTH FLOUNDER	56	2	4	11
DOVER SOLE	25	7	2	21
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	2	2	2	16
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	113	..	..
<u>S. ALUTUS</u>	1180	55	34	316
<u>S. BABCOCKI</u>	19	23	..	137
<u>S. BOREALIS</u>	..	85	..	..
<u>S. BREVISPINIS</u>	..	..	..	26
<u>S. CRAMERI</u>	25	9	..	..
<u>S. DIPLOPROA</u>	38	48	..	126
<u>S. ELONGATUS</u>	..	..	..	..
<u>S. ENTOMELAS</u>	..	..	..	..
<u>S. FLAVIDUS</u>	..	..	..	..
<u>S. HELVOMACULATUS</u>	..	..	..	..
<u>S. PAUCISPINIS</u>	..	..	..	37
<u>S. PINNIGER</u>	..	..	..	..
<u>S. PRORIGER</u>	..	..	..	..
<u>S. REEDI</u>	..	..	..	..
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	..	..	11	26
<u>SEB. ALASCANUS</u>	63	2	2	21
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	521	110	34	242
SABLEFISH	63	9	22	42
WALLEYE POLLOCK	..	..	..	..
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	..	..	..	..
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	..	..	..	..
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	1992	465	111	1021

APPENDIX TABLE 3 (CONTINUED)

Haul Number	13	14	15	16
Date	SEP 10	SEP 10	SEP 10	SEP 10
Area (Major, Minor)	3D,25	3D,25	3D,25	3D,25
Start Time (PST)	10:20	13:20	16:30	18:55
Duration (Min)	145	142	100	147
Start N. Lat. (Deg)	49	49	49	49
(Min)	16.7	10.6	15.7	12.3
W. Long (Deg)	127	127	127	127
(Min)	7.6	0.4	7.1	1.7
Finish N. Lat. (Deg)	49	49	49	49
(Min)	11.1	15.6	11.7	5.9
W. Long (Deg)	127	127	127	126
(Min)	0.4	6.9	2.9	54.4
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0	0.0
Direction (Deg.True)	50	295	110	110
Bottom Depth (M)	265- 291	326- 327	351- 369	274- 285
(Fm)	145- 159	178- 179	192- 202	150- 156
Modal Depth (M)	..	..	..	..
Gear Type	22	22	22	22
Tide	SLACK	EBB	FLOOD	FLOOD
Total Catch (Kg)	435	2187	600	372
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	13	14	15	16
Date	SEP 10	SEP 10	SEP 10	SEP 10
Area (Major, Minor)	3D,25	3D,25	3D,25	3D,25
ARROWTOOTH FLOUNDER	4	..	6	..
DOVER SOLE	4	10	9	2
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	11	..	3	2
OTHER FLATFISH	..	..	..	..
S. <u>ALEUTIANUS</u>	..	31	12	..
S. <u>ALUTUS</u>	79	529	44	57
S. <u>BABCOCKI</u>	23	92	21	8
S. <u>BOREALIS</u>	..	305	91	..
S. <u>BREVISPINIS</u>	..	..	..	..
S. <u>CRAMERI</u>	4	20	27	4
S. <u>DIPLOPROA</u>	21	71	27	34
S. <u>ELONGATUS</u>	..	..	..	..
S. <u>ENTOMELAS</u>	..	20	..	..
S. <u>FLAVIDUS</u>	..	..	..	..
S. <u>HELVOMACULATUS</u>	..	..	..	..
S. <u>PAUCISPINIS</u>	19	..	..	..
S. <u>PINNIGER</u>	..	..	..	..
S. <u>PRORIGER</u>	..	..	..	..
S. <u>REEDI</u>	..	..	..	..
S. <u>RUBERRIMUS</u>	..	..	..	..
S. <u>ZACENTRUS</u>	2	..	..	..
SEB. <u>ALASCANUS</u>	9	10	6	2
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	231	1068	354	227
SABLEFISH	17	..	..	15
WALLEYE POLLOCK	..	..	..	..
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	9	31	..	..
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	2	..	..	21
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	435	2187	600	372

APPENDIX TABLE 3 (CONTINUED)

Haul Number	17	18	19	20
Date	SEP 11	SEP 11	SEP 11	SEP 11
Area (Major, Minor)	3D,25	3D,25	3D,25	3C,24
Start Time (PST)	6:47	9:42	12:34	15:24
Duration (Min)	111	117	100	127
Start N. Lat. (Deg)	49	49	49	49
(Min)	13.7	10.2	6.8	0.8
W. Long (Deg)	149	126	126	125
(Min)	9.4	59.0	55.3	49.2
Finish N. Lat. (Deg)	49	26	49	49
(Min)	9.4	53.8	2.8	5.7
W. Long (Deg)	126	126	126	126
(Min)	53.7	53.8	50.7	55.7
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N MI)	0.0	0.0	0.0	0.0
Direction (Deg.True)	100	162	135	312
Bottom Depth (M)	194- 194	307- 287	291- 283	362- 362
(Fm)	106- 106	168- 157	159- 155	198- 198
Modal Depth (M)	..	..	..	..
Gear Type	22	22	22	22
Tide	FLOOD	FLOOD	EBB	EBB
Total Catch (Kg)	118	641	1121	630
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	17	18	19	20
Date	SEP 11	SEP 11	SEP 11	SEP 11
Area (Major, Minor)	3D,25	3D,25	3D,25	3C,24
ARROWTOOTH FLOUNDER	1	7	17	16
DOVER SOLE	1	10	..	13
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	1	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	3	13	..	13
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	..	..	95
<u>S. ALUTUS</u>	5	230	165	118
<u>S. BABCOCKI</u>	23	26	6	23
<u>S. BOREALIS</u>	..	..	..	..
<u>S. BREVISPINIS</u>	2	10	..	..
<u>S. CRAMERI</u>	4	30	17	13
<u>S. DIPLOPROA</u>	6	95	74	13
<u>S. ELONGATUS</u>	3	..	..	..
<u>S. ENTOMELAS</u>	..	7	..	..
<u>S. FLAVIDUS</u>	..	..	..	..
<u>S. HELVOMACULATUS</u>	..	..	..	..
<u>S. PAUCISPINIS</u>	..	10	..	..
<u>S. PINNIGER</u>	..	10	..	..
<u>S. PRORIGER</u>	1	7	..	..
<u>S. REEDI</u>	..	..	..	..
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	..	..	..	..
<u>SEB. ALASCANUS</u>	1	10	6	29
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	53	157	836	258
SABLEFISH	14	16	..	39
WALLEYE POLLOCK	..	..	..	..
OTHER ROUND FISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	..	..	..	..
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	..	3	..	..
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	118	641	1121	630

APPENDIX TABLE 3 (CONTINUED)

Haul Number	21	22	23	24
Date	SEP 11	SEP 11	SEP 12	SEP 12
Area (Major, Minor)	3C,24	3C,24	3C,24	3C,24
Start Time (PST)	18:30	20:59	6:51	9:45
Duration (Min)	98	33	120	75
Start N. Lat. (Deg)	49	49	49	49
(Min)	3.9	2.7	5.9	1.2
W. Long (Deg)	126	126	126	126
(Min)	53.9	47.9	50.1	47.2
Finish N. Lat. (Deg)	49	49	49	48
(Min)	0.5	4.0	2.4	59.9
W. Long (Deg)	126	126	126	126
(Min)	48.2	50.0	45.1	43.3
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N M1)	0.0	0.0	0.0	0.0
Direction (Deg.True)	141	314	127	135
Bottom Depth (M)	355- 344	216- 219	190- 192	267- 256
(Fm)	194- 188	118- 120	104- 105	146- 140
Modal Depth (M)	..	..	..	..
Gear Type	22	22	22	22
Tide	FLOOD	EBB	FLOOD	FLOOD
Total Catch (Kg)	522	668	643	208
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	21	22	23	24
Date	SEP 11	SEP 11	SEP 12	SEP 12
Area (Major, Minor)	3C,24	3C,24	3C,24	3C,24
ARROWTOOTH FLOUNDER	12	24	12	2
DOVER SOLE	17	3	..	..
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	64	18	3	1
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	20	9	..	..
<u>S. ALUTUS</u>	177	29	..	60
<u>S. BABCOCKI</u>	7	12	12	2
<u>S. BOREALIS</u>	..	..	..	..
<u>S. BREVISPINIS</u>	..	41	68	4
<u>S. CRAMERI</u>	17	..	..	3
<u>S. DIPLOPROA</u>	12	..	..	64
<u>S. ELONGATUS</u>	..	9	..	..
<u>S. ENTOMELAS</u>	..	..	..	..
<u>S. FLAVIDUS</u>	..	..	..	..
<u>S. HELVOMACULATUS</u>	..	..	..	..
<u>S. PAUCISPINIS</u>	..	9	..	4
<u>S. PINNIGER</u>	..	..	12	..
<u>S. PRORIGER</u>	..	..	87	5
<u>S. REEDI</u>	..	47	3	..
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	..	96	3	17
<u>SEB. ALASCANUS</u>	20	3	..	..
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	118	356	369	37
SABLEFISH	44	12	74	8
WALLEYE POLLOCK	..	..	..	..
OTHER ROUND FISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	12	..	..	..
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	2	..	..	1
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	522	668	643	208

APPENDIX TABLE 3 (CONTINUED)

Haul Number	25	26	27	28
Date	SEP 12	SEP 12	SEP 13	SEP 13
Area (Major, Minor)	3C,24	3C,24	3C,24	3C,24
Start Time (PST)	12:17	19:10	7:28	9:32
Duration (Min)	122	111	50	117
Start N. Lat. (Deg)	48	48	48	48
(Min)	59.1	53.6	58.9	53.9
W. Long (Deg)	126	126	126	126
(Min)	41.5	31.6	33.4	31.8
Finish N. Lat. (Deg)	49	48	48	48
(Min)	2.2	49.0	57.6	49.2
W. Long (Deg)	126	126	126	126
(Min)	50.1	33.5	32.5	30.0
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0	0.0
Direction (Deg.True)	264	182	153	174
Bottom Depth (M)	293- 293	247- 296	183- 260	219- 218
(Fm)	160- 160	135- 162	100- 142	120- 119
Modal Depth (M)	..	..	..	..
Gear Type	22	22	22	22
Tide	SLACK	FLOOD	FLOOD	FLOOD
Total Catch (Kg)	1913	1172	158	422
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	25	26	27	28
Date	SEP 12	SEP 12	SEP 13	SEP 13
Area (Major, Minor)	3C,24	3C,24	3C,24	3C,24
ARROWTOOTH FLOUNDER	31	27	1	9
DOVER SOLE	..	..	5	..
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	5	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	..	8	1	..
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	..	..	..
<u>S. ALUTUS</u>	130	380	30	296
<u>S. BABCOCKI</u>	..	31	5	4
<u>S. BOREALIS</u>	..	..	..	..
<u>S. BREVISPINIS</u>	..	..	4	4
<u>S. CRAMERI</u>	21	12	1	..
<u>S. DIPLOPROA</u>	31	150	22	4
<u>S. ELONGATUS</u>	..	..	2	..
<u>S. ENTOMELAS</u>	..	..	..	..
<u>S. FLAVIDUS</u>	..	..	1	..
<u>S. HELVOMACULATUS</u>	..	4	..	..
<u>S. PAUCISPINIS</u>	..	23	..	..
<u>S. PINNIGER</u>	..	..	..	..
<u>S. PRORIGER</u>	..	..	..	32
<u>S. REEDI</u>	..	15	17	9
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	..	..	32	28
<u>SEB. ALASCANUS</u>	5	19	4	6
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	2	..
PACIFIC HAKE	1664	426	23	..
SABLEFISH	26	61	..	26
WALLEYE POLLOCK	..	..	..	..
OTHER ROUND FISH	..	..	..	..
RATFISH	..	8	..	..
SKATES	..	..	..	..
SPINY DOGFISH	..	..	..	4
OTHER SELACHII	..	..	..	..
SPONGES	..	..	7	..
SQUID	..	8	1	..
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	1913	1172	158	422

APPENDIX TABLE 3 (CONTINUED)

Haul Number	29	30	31	32
Date	SEP 13	SEP 13	SEP 13	SEP 13
Area (Major, Minor)	3C,24	3C,24	3C,24	3C,24
Start Time (PST)	12:07	15:27	18:10	20:45
Duration (Min)	156	109	106	90
Start N. Lat. (Deg)	48	48	48	48
(Min)	49.6	47.1	48.8	54.2
W. Long (Deg)	126	126	126	126
(Min)	29.9	21.3	30.3	31.6
Finish N. Lat. (Deg)	48	48	48	48
(Min)	47.1	48.7	53.9	58.2
W. Long (Deg)	126	126	126	126
(Min)	19.6	30.0	31.4	32.9
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0	0.0
Direction (Deg.True)	97	300	292	25
Bottom Depth (M)	192- 190	238- 232	229- 198	210- 210
(Fm)	105- 104	130- 127	125- 108	115- 115
Modal Depth (M)	..	..	..	..
Gear Type	22	22	22	22
Tide	EBB	FLOOD	FLOOD	EBB
Total Catch (Kg)	1370	2472	1624	1150
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	29	30	31	32
Date	SEP 13	SEP 13	SEP 13	SEP 13
Area (Major, Minor)	3C,24	3C,24	3C,24	3C,24
ARROWTOOTH FLOUNDER	..	8	12	91
DOVER SOLE	..	..	..	4
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	..	..	..	4
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	..	..	..
<u>S. ALUTUS</u>	450	1988	1276	263
<u>S. BABCOCKI</u>	8	..	..	14
<u>S. BOREALIS</u>	..	..	..	..
<u>S. BREVISPINIS</u>	50	16	30	35
<u>S. CRAMERI</u>	..	..	..	..
<u>S. DIPLOPROA</u>	4	82	84	49
<u>S. ELONGATUS</u>	..	..	..	4
<u>S. ENTOMELAS</u>	..	..	..	..
<u>S. FLAVIDUS</u>	124	33	30	..
<u>S. HELVOMACULATUS</u>	..	..	..	..
<u>S. PAUCISPINIS</u>	41	25	..	..
<u>S. PINNIGER</u>	45	16	..	..
<u>S. PRORIGER</u>	359	25	..	11
<u>S. REEDI</u>	..	..	..	200
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	50	172	108	112
<u>SEB. ALASCANUS</u>	4	25	12	18
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	12	..	6	4
PACIFIC HAKE	..	..	..	288
SABLEFISH	223	82	30	49
WALLEYE POLLOCK	..	..	..	..
OTHER ROUND FISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	4
SPINY DOGFISH	..	..	36	..
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	..	..	..	..
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	1370	2472	1624	1150

APPENDIX TABLE 3 (CONTINUED)

Haul Number	33	34	35	36
Date	SEP 14	SEP 14	SEP 14	SEP 14
Area (Major, Minor)	3C,24	3C,24	3C,24	3C,24
Start Time (PST)	7:22	9:50	12:20	16:05
Duration (Min)	94	81	189	100
Start N. Lat. (Deg)	48	48	48	48
(Min)	46.9	46.3	50.6	47.2
W. Long (Deg)	126	126	126	126
(Min)	53.6	31.7	32.0	20.4
Finish N. Lat. (Deg)	48	48	48	48
(Min)	47.8	49.9	46.2	48.5
W. Long (Deg)	126	126	126	126
(Min)	31.3	35.7	19.6	27.6
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0	0.0
Direction (Deg.True)	277	270	180	300
Bottom Depth (M)	271- 280	373- 375	230- 227	207- 219
(Fm)	148- 153	204- 205	126- 124	113- 120
Modal Depth (M)	..	..	238	..
Gear Type	22	22	22	22
Tide	FLOOD	FLOOD	SLACK	EBB
Total Catch (Kg)	1215	1221	1108	1010
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	33	34	35	36
Date	SEP 14	SEP 14	SEP 14	SEP 14
Area (Major, Minor)	3C,24	3C,24	3C,24	3C,24
ARROWTOOTH FLOUNDER	33	8	..	13
DOVER SOLE	..	29	6	..
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	..	20	..	..
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	298	..	..
<u>S. ALUTUS</u>	444	600	845	339
<u>S. BABCOCKI</u>	..	8	6	..
<u>S. BOREALIS</u>	..	37	..	..
<u>S. BREVISPINIS</u>	..	..	..	..
<u>S. CRAMERI</u>	85	20	17	9
<u>S. DIPLOPROA</u>	163	4	58	27
<u>S. ELONGATUS</u>	..	..	..	..
<u>S. ENTOMELAS</u>	..	..	..	..
<u>S. FLAVIDUS</u>	..	..	..	..
<u>S. HELVOMACULATUS</u>	..	..	..	..
<u>S. PAUCISPINIS</u>	..	..	12	..
<u>S. PINNIGER</u>	..	..	..	..
<u>S. PRORIGER</u>	..	..	..	4
<u>S. REEDI</u>	..	..	6	..
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	..	..	12	4
<u>SEB. ALASCANUS</u>	..	29	..	4
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	444	139	87	..
SABLEFISH	46	29	47	606
WALLEYE POLLOCK	..	..	6	..
OTHER ROUND FISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	..	..	..	4
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	..	..	6	..
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	1215	1221	1108	1010

APPENDIX TABLE 3 (CONTINUED)

Haul Number	37	38	39	40
Date	SEP 14	SEP 15	SEP 15	SEP 15
Area (Major, Minor)	3C,23	3C,23	3C,23	3C,23
Start Time (PST)	20:07	8:51	11:26	14:43
Duration (Min)	125	62	162	110
Start N. Lat. (Deg)	48	48	48	48
(Min)	41.0	40.9	31.8	25.0
W. Long (Deg)	126	126	126	126
(Min)	14.5	14.7	10.1	5.4
Finish N. Lat. (Deg)	48	48	48	48
(Min)	46.1	38.4	25.1	30.1
W. Long (Deg)	126	126	126	126
(Min)	17.4	12.0	4.3	9.8
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0	0.0
Direction (Deg.True)	300	186	174	300
Bottom Depth (M)	201- 190	256- 236	210- 207	230- 232
(Fm)	110- 104	140- 129	115- 113	126- 127
Modal Depth (M)	..	..	..	..
Gear Type	22	22	22	22
Tide	SLACK	FLOOD	FLOOD	EBB
Total Catch (Kg)	3140	541	576	831
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	37	38	39	40
Date	SEP 14	SEP 15	SEP 15	SEP 15
Area (Major, Minor)	3C,23	3C,23	3C,23	3C,23
ARROWTOOTH FLOUNDER	150	..	3	5
DOVER SOLE	20	..	..	..
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	20	..	..	..
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	..	..	..
<u>S. ALUTUS</u>	1280	110	77	486
<u>S. BABCOCKI</u>	20	34	10	9
<u>S. BOREALIS</u>	..	..	..	..
<u>S. BREVISPINIS</u>	..	..	177	..
<u>S. CRAMERI</u>	..	..	..	..
<u>S. DIPLOPROA</u>	120	253	3	18
<u>S. ELONGATUS</u>	..	..	..	..
<u>S. ENTOMELAS</u>	..	..	..	..
<u>S. FLAVIDUS</u>	..	..	..	..
<u>S. HELVOMACULATUS</u>	..	..	..	..
<u>S. PAUCISPINIS</u>	10	..	..	41
<u>S. PINNIGER</u>	..	..	..	..
<u>S. PRORIGER</u>	..	..	71	37
<u>S. REEDI</u>	30	..	..	..
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	440	37	10	14
<u>SEB. ALASCANUS</u>	100	..	..	5
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	50	..	13	28
PACIFIC COD	..	..	13	9
PACIFIC HAKE	440	..	..	124
SABLEFISH	220	107	87	46
WALLEYE POLLOCK	..	..	..	9
OTHER ROUND FISH	..	..	..	..
RATFISH	10	..	..	..
SKATES	210	..	48	..
SPINY DOGFISH	20	..	64	..
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	..	..	..	..
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	3140	541	576	831

APPENDIX TABLE 3 (CONTINUED)

Haul Number	41	42	43	44
Date	SEP 15	SEP 15	SEP 16	SEP 16
Area (Major, Minor)	3C,23	3C,23	3C,23	3C,23
Start Time (PST)	17:10	20:40	8:47	11:05
Duration (Min)	124	109	105	110
Start N. Lat. (Deg)	48	48	48	48
(Min)	31.1	28.0	31.1	25.3
W. Long (Deg)	126	126	126	126
(Min)	7.8	5.9	10.2	7.6
Finish N. Lat. (Deg)	48	48	48	48
(Min)	25.0	32.5	25.6	30.2
W. Long (Deg)	126	126	126	126
(Min)	3.0	10.3	7.5	10.5
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0	0.0
Direction (Deg.True)	320	350	181	330
Bottom Depth (M)	192- 185	212- 210	265- 260	276- 274
(Fm)	105- 101	116- 115	145- 142	151- 150
Modal Depth (M)	..	..	..	..
Gear Type	22	22	22	22
Tide	EBB	EBB	FLOOD	FLOOD
Total Catch (Kg)	258	2204	759	1325
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	41	42	43	44
Date	SEP 15	SEP 15	SEP 16	SEP 16
Area (Major, Minor)	3C,23	3C,23	3C,23	3C,23
ARROWTOOTH FLOUNDER	10	22	18	..
DOVER SOLE	..	..	..	..
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	1	..	..	6
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	..	..	..
<u>S. ALUTUS</u>	25	22	289	659
<u>S. BABCOCKI</u>	..	..	..	31
<u>S. BOREALIS</u>	..	..	..	..
<u>S. BREVISPINIS</u>	12	..	..	..
<u>S. CRAMERI</u>	..	..	..	13
<u>S. DIPLOPROA</u>	..	..	11	63
<u>S. ELONGATUS</u>	1	22	4	..
<u>S. ENTOMELAS</u>	..	..	7	..
<u>S. FLAVIDUS</u>	..	..	..	..
<u>S. HELVOMACULATUS</u>	1	..	..	..
<u>S. PAUCISPINIS</u>	..	..	..	..
<u>S. PINNIGER</u>	1	..	..	..
<u>S. PRORIGER</u>	3	..	..	..
<u>S. REEDI</u>	..	..	..	..
<u>S. RUBERRIMUS</u>	5	..	..	..
<u>S. ZACENTRUS</u>	2	..	4	..
<u>SEB. ALASCANUS</u>	..	11	4	38
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	12	..	..	..
PACIFIC COD	..	..	..	13
PACIFIC HAKE	58	1991	422	408
SABLEFISH	14	136	..	94
WALLEYE POLLOCK	1	..	..	..
OTHER ROUND FISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	112	..	..	..
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	..	..	..	..
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	258	2204	759	1325

APPENDIX TABLE 3 (CONTINUED)

Haul Number	45	46	47	48
Date	SEP 16	SEP 16	SEP 17	SEP 18
Area (Major, Minor)	3C,23	3C,23	3C,23	3C,21
Start Time (PST)	13:30	16:30	23:27	7:36
Duration (Min)	117	121	50	23
Start N. Lat. (Deg)	48	48	48	48
(Min)	30.3	25.2	19.5	5.6
W. Long (Deg)	126	126	125	125
(Min)	10.6	9.8	52.5	37.5
Finish N. Lat. (Deg)	48	48	48	48
(Min)	24.9	23.1	17.6	4.7
W. Long (Deg)	126	126	125	125
(Min)	9.3	2.6	54.2	36.4
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0	0.0
Direction (Deg.True)	220	130	0	158
Bottom Depth (M)	293- 344	351- 347	223- 274	188- 179
(Fm)	160- 188	192- 190	122- 150	103- 98
Modal Depth (M)	338	..	..	..
Gear Type	22	22	22	22
Tide	SLACK	EBB	SLACK	FLOOD
Total Catch (Kg)	1489	2373	2426	930
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	45	46	47	48
Date	SEP 16	SEP 16	SEP 17	SEP 18
Area (Major, Minor)	3C,23	3C,23	3C,23	3C,21
ARROWTOOTH FLOUNDER	8	129	118	..
DOVER SOLE	..	11	..	..
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	..	11	..	..
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	..	..	..
<u>S. ALUTUS</u>	540	462	947	21
<u>S. BABCOCKI</u>	93	11	..	..
<u>S. BOREALIS</u>	..	..	..	..
<u>S. BREVISPINIS</u>	..	..	..	179
<u>S. CRAMERI</u>	54	32	..	..
<u>S. DIPLOPROA</u>	116	21	..	..
<u>S. ELONGATUS</u>	..	..	10	..
<u>S. ENTOMELAS</u>	..	..	..	..
<u>S. FLAVIDUS</u>	..	..	..	26
<u>S. HELVOMACULATUS</u>	..	..	..	..
<u>S. PAUCISPINIS</u>	..	..	..	473
<u>S. PINNIGER</u>	..	..	..	26
<u>S. PRORIGER</u>	..	..	..	26
<u>S. REEDI</u>	..	..	335	..
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	..	..	..	142
<u>SEB. ALASCANUS</u>	15	54	..	..
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	663	1514	543	37
SABLEFISH	..	21	414	..
WALLEYE POLLOCK	..	..	..	..
OTHER ROUND FISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	21	..	..
SPINY DOGFISH	..	..	59	..
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	..	86	..	..
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	1489	2373	2426	930

APPENDIX TABLE 3 (CONTINUED)

Haul Number	49	50	51	52
Date	SEP 18	SEP 18	SEP 18	SEP 18
Area (Major, Minor)	3C,21	3C,21	3C,21	3C,21
Start Time (PST)	8:40	10:00	12:14	13:31
Duration (Min)	30	30	30	30
Start N. Lat. (Deg)	48	48	48	48
(Min)	4.8	5.9	7.3	7.5
W. Long (Deg)	125	125	125	125
(Min)	36.3	40.1	39.3	37.3
Finish N. Lat. (Deg)	48	48	48	48
(Min)	5.8	4.7	5.6	9.1
W. Long (Deg)	125	125	125	125
(Min)	37.6	38.6	38.4	37.2
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0	0.0
Direction (Deg.True)	280	152	158	358
Bottom Depth (M)	165- 199	274- 421	208- 201	168- 166
(Fm)	90- 109	150- 230	114- 110	92- 91
Modal Depth (M)	..	320	..	..
Gear Type	22	22	22	22
Tide	FLOOD	FLOOD	FLOOD	SLACK
Total Catch (Kg)	70	456	314	40
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	49	50	51	52
Date	SEP 18	SEP 18	SEP 18	SEP 18
Area (Major, Minor)	3C,21	3C,21	3C,21	3C,21
ARROWTOOTH FLOUNDER	9	..	5	4
DOVER SOLE	..	2	..	..
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	1	..	..	1
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	..	..	..
<u>S. ALUTUS</u>	3	243	177	6
<u>S. BABCOCKI</u>	..	..	..	..
<u>S. BOREALIS</u>	..	..	..	..
<u>S. BREVISPINIS</u>	13	..	7	2
<u>S. CRAMERI</u>	..	12	..	..
<u>S. DIPLOPROA</u>	..	99	..	..
<u>S. ELONGATUS</u>	..	..	2	..
<u>S. ENTOMELAS</u>	..	12	3	..
<u>S. FLAVIDUS</u>	..	..	..	..
<u>S. HELVOMACULATUS</u>	..	..	..	..
<u>S. PAUCISPINIS</u>	12	10	..	..
<u>S. PINNIGER</u>	4	..	3	4
<u>S. PRORIGER</u>	3	..	2	..
<u>S. REEDI</u>	..	..	..	..
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	6	27	82	5
<u>SEB. ALASCANUS</u>	..	2	2	..
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	2
PACIFIC HAKE	8	32	28	1
SABLEFISH	1	12	3	3
WALLEYE POLLOCK	..	5	..	..
OTHER ROUNDFISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	10	..	..	12
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	..	..	..	..
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	70	456	314	40

APPENDIX TABLE 3 (CONTINUED)

Haul Number	53	54	55	56
Date	SEP 18	SEP 18	SEP 18	SEP 18
Area (Major, Minor)	3C,21	3C,21	3C,21	3C,21
Start Time (PST)	15:08	16:29	18:15	19:48
Duration (Min)	30	30	30	30
Start N. Lat. (Deg)	48	48	48	48
(Min)	8.1	7.4	8.6	5.9
W. Long (Deg)	125	125	125	125
(Min)	41.7	44.2	42.6	43.9
Finish N. Lat. (Deg)	48	48	48	48
(Min)	6.8	8.4	5.9	6.0
W. Long (Deg)	125	125	125	125
(Min)	43.1	42.8	43.6	41.6
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N M1)	0.0	0.0	0.0	0.0
Direction (Deg.True)	216	26	64	94
Bottom Depth (M)	252- 274	293- 373	393- 408	421- 457
(Fm)	138- 150	160- 204	215- 223	230- 250
Modal Depth (M)	..	..	..	..
Gear Type	22	22	22	22
Tide	SLACK	EBB	EBB	EBB
Total Catch (Kg)	903	1622	285	241
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	53	54	55	56
Date	SEP 18	SEP 18	SEP 18	SEP 18
Area (Major, Minor)	3C,21	3C,21	3C,21	3C,21
ARROWTOOTH FLOUNDER	25	127	..	..
DOVER SOLE	5	16	4	14
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	..	..	..	2
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	..	4	..
<u>S. ALUTUS</u>	648	937	135	51
<u>S. BABCOCKI</u>	5	..	..	..
<u>S. BOREALIS</u>	..	..	7	16
<u>S. BREVISPINIS</u>	..	..	..	..
<u>S. CRAMERI</u>	35	191	6	1
<u>S. DIPLOPROA</u>	..	..	..	..
<u>S. ELONGATUS</u>	5	..	..	..
<u>S. ENTOMELAS</u>	5	..	..	..
<u>S. FLAVIDUS</u>	..	..	..	..
<u>S. HELVOMACULATUS</u>	..	..	..	..
<u>S. PAUCISPINIS</u>	..	..	..	..
<u>S. PINNIGER</u>	..	..	..	..
<u>S. PRORIGER</u>	..	..	..	..
<u>S. REEDI</u>	..	..	..	..
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	120	72	7	1
<u>SEB. ALASCANUS</u>	10	24	..	7
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	35	223	122	149
SABLEFISH	10	32	..	..
WALLEYE POLLOCK	..	..	..	..
OTHER ROUND FISH	..	..	..	..
RATFISH	..	..	..	..
SKATES	..	..	..	..
SPINY DOGFISH	..	..	..	..
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	..	..	..	..
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	903	1622	285	241

APPENDIX TABLE 3 (CONTINUED)

Haul Number	57	58	59	60
Date	SEP 19	SEP 19	SEP 19	SEP 19
Area (Major, Minor)	3C,21	3C,21	3C,21	3C,21
Start Time (PST)	6:57	9:32	12:58	15:00
Duration (Min)	110	28	79	96
Start N. Lat. (Deg)	48	48	48	48
(Min)	20.9	14.8	14.7	16.3
W. Long (Deg)	125	125	125	125
(Min)	51.9	48.1	48.3	44.1
Finish N. Lat. (Deg)	48	48	48	48
(Min)	16.1	15.2	15.8	17.3
W. Long (Deg)	125	125	125	125
(Min)	48.3	46.5	43.0	49.1
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0	0.0
Direction (Deg.True)	159	81	66	226
Bottom Depth (M)	198- 196	238- 243	256- 247	219- 194
(Fm)	108- 107	130- 133	140- 135	120- 106
Modal Depth (M)	..	..	..	..
Gear Type	22	22	22	22
Tide	EBB	EBB	FLOOD	FLOOD
Total Catch (Kg)	0	161	583	1630
Remarks	UNUSABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	57	58	59	60
Date	SEP 19	SEP 19	SEP 19	SEP 19
Area (Major, Minor)	3C,21	3C,21	3C,21	3C,21
ARROWTOOTH FLOUNDER	..	..	9	14
DOVER SOLE	..	..	6	..
ENGLISH SOLE	..	2	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	..	..	..	..
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	..	..	..
<u>S. ALUTUS</u>	..	15	90	37
<u>S. BABCOCKI</u>	..	11	..	42
<u>S. BOREALIS</u>	..	..	..	..
<u>S. BREVISPINIS</u>	..	..	..	..
<u>S. CRAMERI</u>	..	3	..	..
<u>S. DIPLOPROA</u>	..	19	258	5
<u>S. ELONGATUS</u>	..	..	..	19
<u>S. ENTOMELAS</u>	..	..	6	..
<u>S. FLAVIDUS</u>	..	..	..	..
<u>S. HELVOMACULATUS</u>	..	1	..	23
<u>S. PAUCISPINIS</u>	..	..	..	47
<u>S. PINNIGER</u>	..	..	..	19
<u>S. PRORIGER</u>	..	..	..	65
<u>S. REEDI</u>	..	..	..	9
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	..	21	15	47
<u>SEB. ALASCANUS</u>	..	4	3	5
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	..	..	..	1190
PACIFIC COD	..	..	..	..
PACIFIC HAKE	..	10	36	..
SABLEFISH	..	65	160	..
WALLEYE POLLOCK	..	..	..	..
OTHER ROUND FISH	..	..	..	..
RATFISH	..	..	..	5
SKATES	..	..	..	..
SPINY DOGFISH	..	10	..	103
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	..	..	..	..
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	0	161	583	1630

APPENDIX TABLE 3 (CONTINUED)

Haul Number	61	62	63	64
Date	SEP 19	SEP 19	SEP 19	SEP 20
Area (Major, Minor)	3C,21	3C,21	3C,21	3C,21
Start Time (PST)	17:20	19:55	23:05	7:49
Duration (Min)	111	91	55	95
Start N. Lat. (Deg)	48	48	48	48
(Min)	60.3	19.8	19.2	15.0
W. Long (Deg)	125	125	125	125
(Min)	48.5	51.7	53.0	49.1
Finish N. Lat. (Deg)	48	48	48	48
(Min)	22.0	17.9	17.7	17.8
W. Long (Deg)	125	125	125	125
(Min)	51.4	53.7	53.4	52.2
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0	0.0
Direction (Deg.True)	335	260	93	336
Bottom Depth (M)	199- 187	238- 234	238- 311	251- 289
(Fm)	109- 102	130- 128	130- 170	137- 158
Modal Depth (M)	..	..	..	..
Gear Type	22	22	22	22
Tide	SLACK	EBB	EBB	EBB
Total Catch (Kg)	2785	2227	1600	5331
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	61	62	63	64
Date	SEP 19	SEP 19	SEP 19	SEP 20
Area (Major, Minor)	3C,21	3C,21	3C,21	3C,21
ARROWTOOTH FLOUNDER	17	143	135	93
DOVER SOLE	..	34	..	..
ENGLISH SOLE	25	..	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	..	..	..	..
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	..	..	..
<u>S. ALUTUS</u>	166	706	740	3250
<u>S. BABCOCKI</u>	..	..	..	56
<u>S. BOREALIS</u>	..	..	..	..
<u>S. BREVISPINIS</u>	572	..	..	..
<u>S. CRAMERI</u>	..	..	..	19
<u>S. DIPLOPROA</u>	..	109	13	167
<u>S. ELONGATUS</u>	41	20	13	19
<u>S. ENTOMELAS</u>	..	..	..	..
<u>S. FLAVIDUS</u>	..	..	..	..
<u>S. HELVOMACULATUS</u>	..	..	..	..
<u>S. PAUCISPINIS</u>	1011	27	..	..
<u>S. PINNIGER</u>	17	..	..	..
<u>S. PRORIGER</u>	116	..	..	..
<u>S. REEDI</u>	83	122	34	93
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	282	109	87	74
<u>SEB. ALASCANUS</u>	8	54	20	19
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	..	88	..	..
PACIFIC COD	..	20	..	..
PACIFIC HAKE	41	679	410	1374
SABLEFISH	157	75	148	167
WALLEYE POLLOCK	..	..	..	..
OTHER ROUND FISH	..	..	..	..
RATFISH	17	27	..	..
SKATES	..	..	..	..
SPINY DOGFISH	232	14	..	..
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	..	..	..	..
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	2785	2227	1600	5331

APPENDIX TABLE 3 (CONTINUED)

Haul Number	65	66	67	68
Date	SEP 20	SEP 20	SEP 20	SEP 20
Area (Major, Minor)	3C,21	3C,21	3C,23	3C,23
Start Time (PST)	11:20	14:42	15:50	19:25
Duration (Min)	115	10	155	118
Start N. Lat. (Deg)	48	48	48	48
(Min)	13.4	22.3	24.6	23.5
W. Long (Deg)	125	125	125	126
(Min)	48.8	52.4	57.5	5.1
Finish N. Lat. (Deg)	48	48	48	48
(Min)	18.1	22.7	24.2	24.5
W. Long (Deg)	125	125	126	125
(Min)	52.2	52.7	7.3	56.9
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0	0.0
Direction (Deg.True)	336	333	238	103
Bottom Depth (M)	283- 238	260- 282	311- 300	282- 293
(Fm)	155- 130	142- 154	170- 164	154- 160
Modal Depth (M)	..	..	..	..
Gear Type	22	22	22	22
Tide	EBB	FLOOD	SLACK	FLOOD
Total Catch (Kg)	3968	0	2524	1164
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	65	66	67	68
Date	SEP 20	SEP 20	SEP 20	SEP 20
Area (Major, Minor)	3C,21	3C,21	3C,23	3C,23
ARROWTOOTH FLOUNDER	42	..	460	174
DOVER SOLE	28	..	54	5
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	15	..
REX SOLE	..	..	8	5
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	..	..	..
<u>S. ALUTUS</u>	2458	..	897	157
<u>S. BABCOCKI</u>	56	..	92	16
<u>S. BOREALIS</u>	..	..	54	..
<u>S. BREVISPINIS</u>	..	..	15	..
<u>S. CRAMERI</u>	42	..	138	16
<u>S. DIPLOPROA</u>	297	..	115	108
<u>S. ELONGATUS</u>	..	..	..	..
<u>S. ENTOMELAS</u>	..	..	..	..
<u>S. FLAVIDUS</u>	..	..	..	..
<u>S. HELVOMACULATUS</u>	..	..	..	11
<u>S. PAUCISPINIS</u>	..	..	..	..
<u>S. PINNIGER</u>	..	..	..	..
<u>S. PRORIGER</u>	..	..	..	5
<u>S. REEDI</u>	..	..	..	..
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	141	..	15	33
<u>SEB. ALASCANUS</u>	28	..	77	16
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	650	..	514	569
SABLEFISH	226	..	31	49
WALLEYE POLLOCK	..	..	..	..
OTHER ROUND FISH	..	..	..	..
RATFISH	..	..	8	..
SKATES	..	..	..	..
SPINY DOGFISH	..	..	31	..
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	..	..	..	..
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	3968	0	2524	1164

APPENDIX TABLE 3 (CONTINUED)

Haul Number	69	70	71	72
Date	SEP 21	SEP 21	SEP 21	SEP 22
Area (Major, Minor)	3C,23	3C,23	3C,23	3C,21
Start Time (PST)	7:07	12:07	16:20	7:40
Duration (Min)	141	133	100	95
Start N. Lat. (Deg)	48	48	48	48
(Min)	15.0	14.4	14.5	14.8
W. Long (Deg)	125	125	125	125
(Min)	49.7	49.3	48.7	49.0
Finish N. Lat. (Deg)	48	48	48	48
(Min)	17.9	17.6	16.9	17.4
W. Long (Deg)	125	125	125	125
(Min)	55.3	53.7	52.1	59.2
Haul Distance (Km)	0.0	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0	0.0
Direction (Deg.True)	345	335	332	335
Bottom Depth (M)	280- 271	311- 293	249- 293	252- 276
(Fm)	153- 148	170- 160	136- 160	138- 151
Modal Depth (M)	..	..	247	256
Gear Type	22	22	22	22
Tide	SLACK	FLOOD	FLOOD	SLACK
Total Catch (Kg)	3744	3043	5670	511
Remarks	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	69	70	71	72
Date	SEP 21	SEP 21	SEP 21	SEP 22
Area (Major, Minor)	3C,23	3C,23	3C,23	3C,21
ARROWTOOTH FLOUNDER	149	86	168	39
DOVER SOLE	14	17	..	3
ENGLISH SOLE	..	..	..	..
FLATHEAD SOLE	..	..	..	..
PETRALE SOLE	..	..	..	..
REX SOLE	..	..	..	..
OTHER FLATFISH	..	..	..	..
<u>S. ALEUTIANUS</u>	..	..	..	..
<u>S. ALUTUS</u>	1999	2081	4074	328
<u>S. BABCOCKI</u>	41	17	21	9
<u>S. BOREALIS</u>	..	..	..	..
<u>S. BREVISPINIS</u>	..	..	..	..
<u>S. CRAMERI</u>	135	103	..	6
<u>S. DIPLOPROA</u>	216	258	231	15
<u>S. ELONGATUS</u>	..	..	21	..
<u>S. ENTOMELAS</u>	..	..	21	..
<u>S. FLAVIDUS</u>	..	..	..	..
<u>S. HELVOMACULATUS</u>	..	..	..	..
<u>S. PAUCISPINIS</u>	54	..	..	..
<u>S. PINNIGER</u>	..	..	..	..
<u>S. PRORIGER</u>	..	..	..	6
<u>S. REEDI</u>	14	..	21	..
<u>S. RUBERRIMUS</u>	..	..	..	..
<u>S. ZACENTRUS</u>	162	155	420	45
<u>SEB. ALASCANUS</u>	14	34	..	..
OTHER ROCKFISH	..	..	..	..
BLACKTAIL SNAILFISH	..	..	..	..
LINGCOD	..	..	..	..
PACIFIC COD	..	..	..	..
PACIFIC HAKE	865	120	567	24
SABLEFISH	81	155	21	33
WALLEYE POLLOCK	..	..	..	..
OTHER ROUND FISH	..	..	..	..
RATFISH	..	..	..	3
SKATES	..	..	..	..
SPINY DOGFISH	..	17	105	..
OTHER SELACHII	..	..	..	..
SPONGES	..	..	..	..
SQUID	..	..	..	..
OTHER INVERTEBRATES	..	..	..	..
Total Catch (Kg)	3744	3043	5670	511

APPENDIX TABLE 3 (CONTINUED)

Haul Number	73	74	75
Date	SEP 22	SEP 22	SEP 22
Area (Major, Minor)	3C,21	3C,21	3C,23
Start Time (PST)	10:25	13:59	17:00
Duration (Min)	120	91	75
Start N. Lat. (Deg)	48	48	48
(Min)	15.2	14.6	14.3
W. Long (Deg)	125	125	125
(Min)	47.3	49.0	48.7
Finish N. Lat. (Deg)	48	48	48
(Min)	78.0	16.9	17.0
W. Long (Deg)	125	125	125
(Min)	52.1	52.1	49.1
Haul Distance (Km)	0.0	0.0	0.0
(N Mi)	0.0	0.0	0.0
Direction (Deg.True)	250	347	6
Bottom Depth (M)	223- 289	293- 289	274- 214
(Fm)	122- 158	160- 158	150- 117
Modal Depth (M)	247	..	219
Gear Type	22	22	22
Tide	FLOOD	FLOOD	EBB
Total Catch (Kg)	2432	1542	1371
Remarks	USABLE	USABLE	USABLE

APPENDIX TABLE 3 (CONTINUED)

Haul Number	73	74	75
Date	SEP 22	SEP 22	SEP 22
Area (Major, Minor)	3C,21	3C,21	3C,23
ARROWTOOTH FLOUNDER	185	40	20
DOVER SOLE	12	16	..
ENGLISH SOLE	..	..	..
FLATHEAD SOLE	..	..	..
PETRALE SOLE	..	..	..
REX SOLE	..	..	..
OTHER FLATFISH	..	..	..
<u>S. ALEUTIANUS</u>	..	..	..
<u>S. ALUTUS</u>	1262	884	566
<u>S. BABCOCKI</u>	..	64	7
<u>S. BOREALIS</u>	..	..	..
<u>S. BREVISPINIS</u>	..	..	..
<u>S. CRAMERI</u>	23	8	..
<u>S. DIPLOPROA</u>	255	68	26
<u>S. ELONGATUS</u>	..	..	7
<u>S. ENTOMELAS</u>	..	..	..
<u>S. FLAVIDUS</u>	..	..	..
<u>S. HELVOMACULATUS</u>	..	..	..
<u>S. PAUCISPINIS</u>	35	..	33
<u>S. PINNIGER</u>	..	..	..
<u>S. PRORIGER</u>	..	..	..
<u>S. REEDI</u>	35	..	7
<u>S. RUBERRIMUS</u>	..	..	..
<u>S. ZACENTRUS</u>	370	145	72
<u>SEB. ALASCANUS</u>	46	40	7
OTHER ROCKFISH	..	..	..
BLACKTAIL SNAILFISH	..	..	..
LINGCOD	..	..	..
PACIFIC COD	..	..	7
PACIFIC HAKE	12	80	20
SABLEFISH	139	145	553
WALLEYE POLLOCK	..	..	..
OTHER ROUND FISH	..	..	..
RATFISH	35	..	..
SKATES	..	..	..
SPINY DOGFISH	23	32	46
OTHER SELACHII	..	..	..
SPONGES	..	..	..
SQUID	..	..	..
OTHER INVERTEBRATES	..	..	..
Total Catch (Kg)	2432	1542	1371

Footnotes to Appendix Table 3.

Locality designation:

Haul	Common Name of Locality
1-15	Estevan North
16-23	Estevan South
24,25	Clayoquot North
26-36	Clayoquot South
37,38	Deep Big Bank North
39-46,67,68	Deep Big Bank South
66	Cape Flattery North
58-65	Cape Flattery South
48-56	Cape Flattery South (in U.S. waters)
47,69-75	Cape Flattery South (unused hauls)
57	not used in analyses

Other flatfish includes: Pacific halibut (Hippoglossus stenolepis), slender sole (Lyopsetta exilis)

Other rockfish includes: shortbelly rockfish (Sebastes jordanii), pygmy rockfish (S. wilsoni)

Other roundfish includes: American shad (Alosa sapidissima), eelpouts (Family Zoarcidae), eulachon (Thaleichthys pacificus), sculpins (Family Cottidae)

Appendix Table 4. Area (sq. naut. mi.) of depth strata by locality, M/V HOWE BAY, September 1985.

Locality	160-220	221-275	276-330	331-384	385-439
Estevan North	64.4	20.3	8.1	7.6	7.2
Estevan South	47.6	30.8	10.8	15.9	—*
Clayoquot North	—	7.8	5.8	—	—
Clayoquot South	60.0	18.4	22.7	12.4	—
Deep Big Bank North	28.7	7.0	—	—	—
Deep Big Bank South	52.2	22.4	18.2	8.8	—
Cape Flattery South	32.8	10.7	16.6	—	—

* — blanks indicate that no hauls were made at these depth strata in these localities, and thus the areas were not determined.

Appendix Table 5. Common and scientific names of species encountered, M/V HOWE BAY, September 1985.

Common Name	Scientific Name
<u>Flatfish</u>	
Arrowtooth flounder	<u>Atheresthes stomias</u>
Petrale sole	<u>Eopsetta jordani</u>
Rex sole	<u>Glyptocephalus zachirus</u>
Pacific halibut	<u>Hippoglossus stenolepis</u>
Dover sole	<u>Microstomus pacificus</u>
English sole	<u>Parophrys vetulus</u>
<u>Roundfish</u>	
Sablefish	<u>Anoplopoma fimbria</u>
Blacktail snailfish	<u>Careproctus melanurus</u>
Pacific cod	<u>Gadus macrocephalus</u>
Pacific hake	<u>Merluccius productus</u>
Lingcod	<u>Ophiodon elongatus</u>
Rougheye rockfish	<u>Sebastes aleutianus</u>
Pacific ocean perch	<u>S. alutus</u>
Redbanded rockfish	<u>S. babcocki</u>
Shortraker rockfish	<u>S. borealis</u>
Silvergray rockfish	<u>S. brevispinis</u>
Darkblotched rockfish	<u>S. crameri</u>
Greenstriped rockfish	<u>S. elongatus</u>
Widow rockfish	<u>S. entomelas</u>
Yellowtail rockfish	<u>S. flavidus</u>
Rosethorn rockfish	<u>S. helvomaculatus</u>
Boccacio	<u>S. paucispinis</u>
Canary rockfish	<u>S. pinniger</u>
Redstripe rockfish	<u>S. proriger</u>
Yellowmouth rockfish	<u>S. reedi</u>
Yelloweye rockfish	<u>S. ruberrimus</u>
Sharpchin rockfish	<u>S. zacentrus</u>
Shortspine thornyhead	<u>Sebastolobus alascanus</u>
Walleye pollock	<u>Theragra chalcogramma</u>
<u>Selachii</u>	
Ratfish	<u>Hydrolagus colliei</u>
Dogfish	<u>Squalus acanthias</u>
Skates	<u>Raja spp.</u>

Appendix Table 6. Size composition and maturity data summary for *S. alutus* by area and set, M/V HOWE BAY, September 1985 (see Appendix Table 8 for explanation of maturity codes).

Area	08 09 85		S. Estevan		10 09 85		Total	
Date (D/M/Y)	302		280		326			
Depth (m)	2		9		14			
Set	M	F	M	F	M	F	M	F
Length (cm)								
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0
27	0	0	0	0	0	1	0	1
28	0	0	0	0	0	0	0	0
29	0	0	0	0	1	0	1	0
30	1	0	1	1	0	1	2	2
31	2	3	1	0	3	0	6	3
32	3	3	4	0	1	1	8	4
33	4	0	0	0	0	3	4	3
34	2	2	3	4	1	1	6	7
35	4	2	1	3	2	1	7	6
36	4	0	4	3	5	0	13	3
37	13	0	7	3	17	1	37	4
38	15	2	15	1	20	3	50	6
39	13	2	14	3	10	4	37	9
40	8	3	10	4	4	5	22	12
41	3	4	4	4	2	5	9	13
42	1	3	2	4	0	4	3	11
43	0	2	0	1	0	3	0	6
44	0	0	0	2	0	0	0	2
45	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0
Total	73	26	66	33	66	33	205	92
Maturities								
1	7	7	3	6	4	6	14	19
2	41	6	31	25	37	23	109	54
3	0	12	0	1	0	0	0	13
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	25	1	32	1	25	3	82	5
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0

Appendix Table 6 (cont'd)

Area Date Depth Set	S. Clayoquot							
	12 09 85		13 09 85		13 09 85		13 09 85	
	282		219		201		229	
	26		28		29		30	
	M	F	M	F	M	F	M	F
Length (cm)								
21	0	0	0	0	0	1	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0
27	0	0	0	0	1	0	0	0
28	0	0	0	0	0	0	0	0
29	0	0	0	0	1	0	0	0
30	0	0	1	0	0	0	0	0
31	1	1	0	0	0	0	1	0
32	1	2	1	0	0	0	1	1
33	3	0	0	2	0	3	0	2
34	1	2	1	0	1	0	1	5
35	2	3	4	2	1	6	3	3
36	1	3	0	1	0	3	0	1
37	3	1	0	1	1	2	4	2
38	6	3	3	2	1	1	5	0
39	6	1	9	2	1	1	10	1
40	14	5	6	5	1	5	7	7
41	4	8	5	8	1	17	2	6
42	6	10	0	13	0	17	2	13
43	0	5	1	11	0	12	4	6
44	0	4	0	6	0	11	0	3
45	0	4	0	6	0	8	0	6
46	0	0	0	3	0	2	0	3
47	0	0	0	3	0	0	0	0
48	0	0	0	3	0	1	0	0
Total	48	52	31	68	9	90	40	59
Maturities								
1	3	4	5	4	2	9	3	7
2	30	44	0	63	3	73	36	48
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	1	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	15	3	26	1	4	8	1	4
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0

Appendix Table 6 (cont'd)

[illegible]

Appendix Table 6 (cont'd)

Area Date Depth Set	14 09 85		16 09 85		16 09 85		Total	
	M	F	M	F	M	F	M	F
Length (cm)								
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	1	0	0	0	1	0
24	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0
28	0	1	0	0	0	0	0	1
29	1	0	0	0	0	1	1	1
30	0	0	1	0	1	0	2	0
31	0	0	0	0	2	0	2	0
32	1	0	1	2	0	2	2	4
33	0	0	2	5	2	1	4	6
34	0	0	2	1	1	0	3	1
35	1	1	1	1	6	1	8	3
36	1	1	2	2	12	2	15	5
37	5	0	2	1	17	0	24	1
38	4	0	10	0	17	1	31	1
39	13	2	3	3	6	5	22	10
40	13	5	12	7	1	2	26	14
41	5	7	5	12	4	8	14	27
42	5	10	2	2	0	3	7	15
43	1	8	0	9	0	3	1	20
44	0	12	0	8	0	0	0	20
45	0	1	0	2	0	0	0	3
46	0	1	0	0	0	1	0	2
47	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0
Total	50	49	44	55	69	30	163	134
Maturities								
1	2	2	4	9	3	5	9	16
2	45	41	0	46	61	24	106	111
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	3	6	40	0	5	0	48	6
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0

Appendix Table 6 (cont'd)

Area		S. Cape Flattery Spit							
Date		18 09 85		18 09 85		19 09 85		19 09 85	
Depth		243		256		274		247	
Set		50		53		62		63	
		M	F	M	F	M	F	M	F
Length (cm)									
21		0	0	0	0	0	0	0	0
22		0	0	0	0	0	0	0	0
23		0	0	0	0	0	0	0	0
24		0	0	0	0	0	0	0	0
25		0	0	1	0	0	1	0	0
26		0	0	0	0	0	0	0	0
27		0	0	0	0	2	0	0	0
28		0	1	0	0	0	0	0	0
29		0	0	0	1	2	0	0	0
30		0	0	1	0	3	0	0	0
31		0	0	0	0	0	3	0	0
32		0	2	1	1	2	0	0	0
33		0	1	3	2	1	0	0	0
34		1	2	1	3	0	2	1	1
35		0	0	3	2	3	1	1	0
36		2	1	5	0	5	0	0	0
37		5	0	8	0	5	2	2	0
38		10	0	14	2	14	3	9	0
39		22	0	24	0	11	4	10	2
40		27	2	13	3	10	2	13	7
41		10	1	5	0	2	5	7	14
42		6	1	1	2	3	8	2	12
43		3	1	0	1	0	3	0	9
44		0	1	1	2	0	1	0	6
45		0	0	0	0	0	1	0	2
46		0	0	0	0	0	0	0	1
47		0	0	0	0	0	0	0	0
48		0	0	0	0	0	0	0	0
Total		86	13	81	19	63	36	45	54
Maturities									
1		0	7	5	5	10	5	0	1
2		1	6	0	14	49	26	0	52
3		0	0	0	0	0	0	0	0
4		0	0	0	0	0	0	0	0
5		0	0	0	0	0	0	0	0
6		0	0	0	0	0	0	0	0
7		85	0	76	0	4	5	45	1
8		0	0	0	0	0	0	0	0
9		0	0	0	0	0	0	0	0

Appendix Table 6 (cont'd)

Area Date Depth Set	S. Cape		Flattery Spit					
	20 09 85		20 09 85					
	256		256					
	64		66		Total		Grand Total	
	M	F	M	F	M	F	M	F
Length (cm)								
21	0	0	0	0	0	0	0	1
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	1	0
24	0	0	0	1	0	1	0	1
25	0	0	0	0	1	1	1	1
26	0	1	0	0	0	1	0	1
27	0	0	0	0	2	0	3	2
28	0	0	1	0	1	1	2	3
29	0	0	0	0	2	1	5	2
30	0	0	4	0	8	0	15	3
31	0	0	1	2	1	5	15	12
32	0	0	1	1	4	4	23	21
33	1	0	3	2	8	5	22	25
34	0	0	2	0	5	8	24	28
35	1	2	2	2	10	7	42	36
36	2	3	7	0	21	4	69	27
37	4	1	11	2	35	5	128	26
38	8	2	12	5	67	12	192	43
39	11	2	7	5	85	13	207	58
40	16	8	5	8	84	30	190	108
41	9	5	1	7	34	32	83	141
42	1	7	0	4	13	34	38	137
43	0	11	0	2	3	27	14	100
44	0	1	0	0	1	11	1	69
45	0	3	0	1	0	7	0	40
46	0	0	0	0	0	1	0	13
47	0	0	0	0	0	0	0	5
48	0	0	0	0	0	0	0	4
Total	53	46	57	42	385	210	1075	907
Maturities								
1	0	3	13	6	28	27	790	109
2	52	36	3	36	105	170	528	730
3	0	0	0	0	0	0	0	13
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	3
6	0	0	0	0	0	0	0	0
7	1	7	41	0	252	13	468	50
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0

Appendix Table 7. Size composition and maturity data summary for *S. brevispinis* by area and set, M/V HOWE BAY, September 1985 (see Appendix table 8 for explanation of maturity codes).

Area	S. Cape Flattery Spit	
Date	19 09 85	
Depth	201	
Set	061	
	M	F
Length (cm)		
21	0	1
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	0	0
35	0	0
36	0	0
37	0	0
38	1	0
39	0	0
40	0	0
41	0	0
42	0	1
43	1	0
44	0	0
45	2	0
46	1	0
47	1	3
48	5	2
49	5	1
50	9	8
51	6	10
52	4	0
53	2	5
54	4	1
55	6	1
56	3	0
57	6	4
58	3	1

Appendix Table 7 (cont'd).

Area	S. Cape Flattery Spit	
	19 09 85	
Date	201	
Depth	061	
Set	M	F
Length (cm)		
59	0	1
60	0	0
61	0	0
62	0	0
63	0	1
Total	59	40
Maturities		
1	1	0
2	34	0
3	0	0
4	0	0
5	0	0
6	0	7
7	24	33
8	0	0
9	0	0

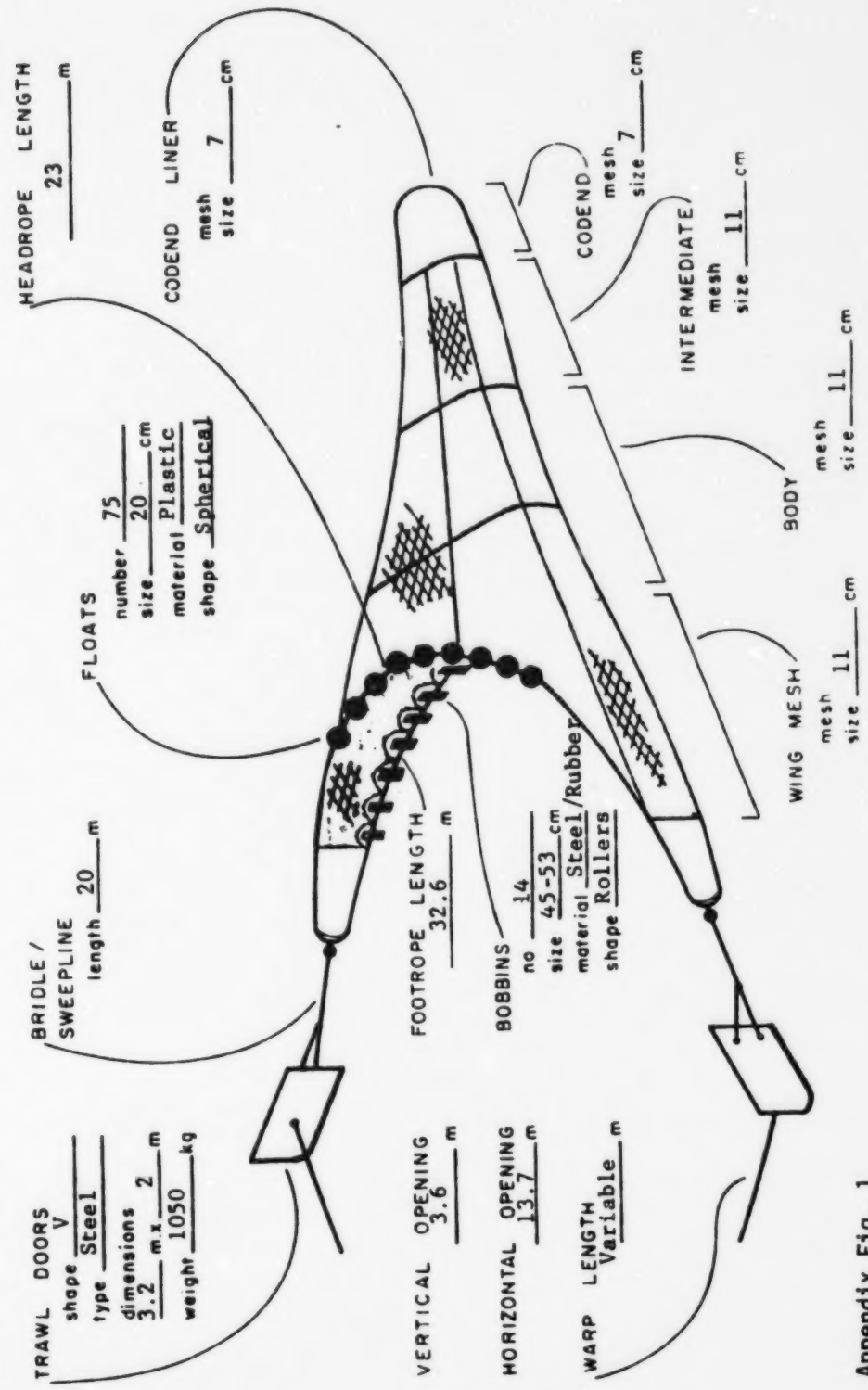
Appendix Table 8. Description of rockfish maturity stages.

Maturity Codes		Gonad Condition
Females:	1 Immature	(translucent, small)
	2 Maturing/small	(small yellow eggs, translucent or opaque)
	3 Maturing/large	(large yellow eggs, opaque)
	4 Mature	(large orange-yellow eggs, translucent)
	5 Embryos or larvae	(includes eyed eggs)
	6 Spent	(large flaccid red ovaries, a few larvae may be present)
	7 Resting	(moderate size firm red-grey ovaries)
Males:	1 Immature	(translucent, string-like)
	2 Maturing	(swelling, brown-white)
	4 Mature	(large, white, easily broken)
	5 Ripe	(running sperm)
	6 Spent	(flaccid, red)
	7 Resting	(ribbon-like, small, brown)

NET DIMENSIONS AND CHARACTERISTICS FOR BOTTOM TRAWL

VESSEL M/V Howe Bay NET Atlantic Western II A

OBSERVATION PERIOD Sept. 7-23, 1985



Appendix Fig. 1.